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VOLUME XXI

NUMBER 2

OCTOBER 1955

PUBLISHED BY THE SOCIETY
FOR AMERICAN ARCHAEOLOGY

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American Antiquity is published by the SOCIETY FOR AMERICAN ARCHAEOLOGY during the months of January, April, July, and October. Subscription is by membership; annual dues are $6.00, of which $5.00 is for a subscription to *American Antiquity* and other publications as issued.

American Antiquity is printed by the University of Utah Press, University of Utah, Salt Lake City 12, Utah.

Entered as second-class matter June 1, 1951, at the post office at Salt Lake City, Utah, under the Act of March 3, 1879.

Articles and "Facts and Comments" should be submitted to the Editor, reviews and publications for review to the Review Editor. Information for "Notes and News" should be sent to the appropriate Assistant Editor.

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AMERICAN ANTIQUITY

Vol. XXI October, 1955 No. 2

THE ARCHAIC TRADITION IN PUERTO RICO

Ricardo Alegría, H. B. Nicholson, and Gordon R. Willey

BOTH HISTORICAL and archaeological sources on the West Indies provide evidence that these islands were once occupied by peoples with a culture markedly different from that of the agricultural, pottery-making Arawak. The archaeological remains of this Archaic mode of life are found on several of the islands in contexts which indicate their separateness from the pottery horizons and imply their greater antiquity. The ethnohistorical sources also attest to the survival of this Archaic tradition into early historic times (Martyr 1912 Vol. 1: 100, 380; Las Casas 1867: 35; 1951 Vol. 2: 240; Velásquez 1869: 424-5; Oviedo 1852 Vol. 1: 90).

The characteristics of this West Indian Archaic tradition, as revealed by archaeology and supplemented by the ethnohistoric accounts, are: absence of agriculture and pottery; seminomadic living in small bands; frequent use of caves for shelter and burial; crude artifacts made of conch shells, flint, and other classes of stone; use of hematite or red ocher; and the absence of cranial deformation as practiced by the agricultural peoples of the Antilles.

Cultural tradition is here defined, following Phillips and Willey (1953), as "a major large-scale space-time-cultural continuity, defined with reference to persistent configurations in single technologies or total (archaeological) culture, occupying a relatively long interval of time and a quantitatively variable but environmentally significant space."

In Cuba the Archaic tradition is represented by the preceramic finds of Harrington (1921), labeled by him with the controversial ethnic term, "Ciboney," and by those of Rouse (1942: 131), Osgood (1942), Ortiz (1943), Cosculluela (1922), and others. Rock-shelter and coastal shell-midden sites are typical of the Cuban Archaic. Shell gouges, shell celts, vessels and dishes made of conch shells, shell or stone pendants of simple design, pitted hammerstones, hammer-grinders, stone balls, slightly retouched flint flakes, peg-shaped stones or *gladiolitos*, and pieces of red ocher are diagnostic features of the preceramic assemblage on this island. Harrington also found burials in cave floors; the skulls were undeformed and the bones often stained with red ocher. The antiquity of these Cuban Archaic finds is demonstrated by their association with the bones of *Megalocnus*, an extinct ground sloth.

The Archaic of Cuba has been divided into 2 distinct phases, perhaps chronologically sequent, called by Rouse (1951a: 253) Guayabo Blanco and Cayo Redondo. The former contains no evidence of stone grinding and is characterized by what Rouse refers to as the "battering stone" and deep vessels made of the conch. Cayo Redondo, on the other hand, lacks the deep conch shell vessels, and has a ground-stone inventory consisting of various grinding implements, stone balls, and the curious peg-shaped stones, the gladiolitos.

On the island of Hispaniola the existence of Archaic cultures in prehistoric times has been demonstrated by the work of Gabb (1881), Krieger (1929), and Rouse (1939; 1941). The early historical accounts also mention the existence of primitive pre-agricultural groups who lived in the Peninsula of Guacayarima up to the time of the conquest, and who may have been marginal surviving remnants of the old tradition (Martyr 1912 Vol. 1: 380; Oviedo 1852 Vol. 1: 90).

Rouse subdivides the Archaic of Haiti into 3 phases: Couri (northern); Cabaret (central); and Bay of Conch (southern) (Rouse 1951a: 253). The chief diagnostic of Couri is an assemblage of crude stone tools "made by finely rechipping the edges of large lamellar flakes" (p. 253). Ground stone is also well represented in this phase and includes single- and double-bitted axes, balls, dishes, beads, gladiolitos, mortars and pestles, and milling and polishing stones. The Bay of Conch inventory is similar to Couri, with the addition of pointed stone tools and single-bitted eared stone axes. Cabaret is much the simplest of the 3 phases. Only

chipped stone work is found, comparable to Cuba rather than Couri or Bay of Conch.

In the Dominican Republic both Gabb and Krieger dug into cave stratifications in the vicinity of Samaná Bay in which upper level deposits held pottery while the lower strata contained only implements of shell, bone, and stone. Krieger (1929: 68) holds that these artifacts show great similarity to those found by Harrington in his preceramic sites in Cuba.

For Puerto Rico there are no ethnohistorical references to nonagricultural groups similar to those mentioned by the chroniclers in Cuba and Hispaniola; however, their prehistoric existence has been postulated by Rouse (1952: 355). During his survey of Puerto Rico and Vieques, Rouse located several sites with small shell heaps which appeared to contain no pottery. Excavation at 5 of these sites verified this absence of pottery, but the material recovered was so meager and of such dubious artifactual character that Rouse hesitated to claim with certainty that a genuine preceramic occupation of these islands had been demonstrated. Although he felt that it was unlikely that these nonceramic shell heaps were "the by-product of a later Indian or Spanish occupation" (Rouse 1952: 382), he was convinced that further excavations were necessary before the problem could be resolved. All the sites were located close to the shore in regions where shellfish were, or had been, abundant. In all cases "there is a bay in the immediate vicinity, backed by a mud flat or a swamp which could have been used as a base for hunting and fishing" (p. 335). In these respects the sites resemble the nonceramic shell heaps of Cuba and Hispaniola. The possible stone artifacts described by Rouse from these Puerto Rican nonceramic sites include: "several pebbles battered on their ends, another with several grinding facets, a number of sharp-edged pieces of flint or other stone, and several flat stone slabs" (p. 335).

To date, no evidence of the Archaic has appeared in Jamaica. Krieger has reported a possible nonceramic assemblage from the Bahamas (Krieger 1937: 98), but it has not been fully described or illustrated. In the Virgin Islands Hatt (1924) reported nonceramic refuse deposits in shell heaps at Krum Bay, St. Thomas. Hammerstone grinders, red ocher, and a "peculiar long and narrow type of stone axe" are listed as associated artifacts, but the full assemblage has never been thoroughly described. No Archaic remains have as yet been reported from the Lesser Antilles, but much of this area is an archaeological terra incognita. It is not until Trinidad (Rouse 1953) and Venezuela (Rouse 1951b) are reached that evidence occurs of comparable nonceramic phases.

The putative preceramic or Archaic manifestation in Puerto Rico, which Rouse has labeled the Coroso, is the subject of this paper. Recent excavations have brought to light new evidence which proves its existence. We also wish to make some comparisons which have not been made before.

The Loiza Cave Excavations

One of the most obvious desiderata connected with the problem of a possible preceramic occupation of Puerto Rico was the locating of an actual occupation site over and above the scanty shellheaps investigated by Rouse. In 1948, Ricardo Alegría, as part of the program of the newly organized Centro de Investigaciones Arqueológicas of the University of Puerto Rico, initiated excavations at a rich ceramic site near Loiza Aldea, close to the northeast coast. A few hundred yards southwest of this site is a large limestone cave, known locally as Cueva María de la Cruz. Portions of its rocky floor had long been utilized as a stone quarry, but near the western entrance was a fairly extensive area of hard-packed earth mixed with detritus fallen from the ceiling which appeared to be relatively undisturbed. Supplementary to the excavation of the ceramic site, 2 test pits, totaling 5 sq. m. in area, were dug into a portion of this floor near the western wall of the cave.

The pits were dug by 1-foot levels. The 1st level yielded a number of Igneri phase sherds, including 1 large rim fragment of the diagnostic Cuevas white-on-red ware, 7 stone artifacts quite unlike those found in the nearby ceramic site (all artifacts will be described in the next section), large numbers of shells, animal and fish bones, nondescript fragments of rock, and a few scattered human bones. The 2nd level yielded only 5 sherds, plus 5 artifacts of stone and an even thicker deposit of shells and animal bones. The 3rd and 4th levels were completely pottery-free. The heavy concentration of animal bones (many of them fossilized) and shells continued. Most importantly, many of the animal bones showed evidence of burning, and thick deposits of gray ash were en-

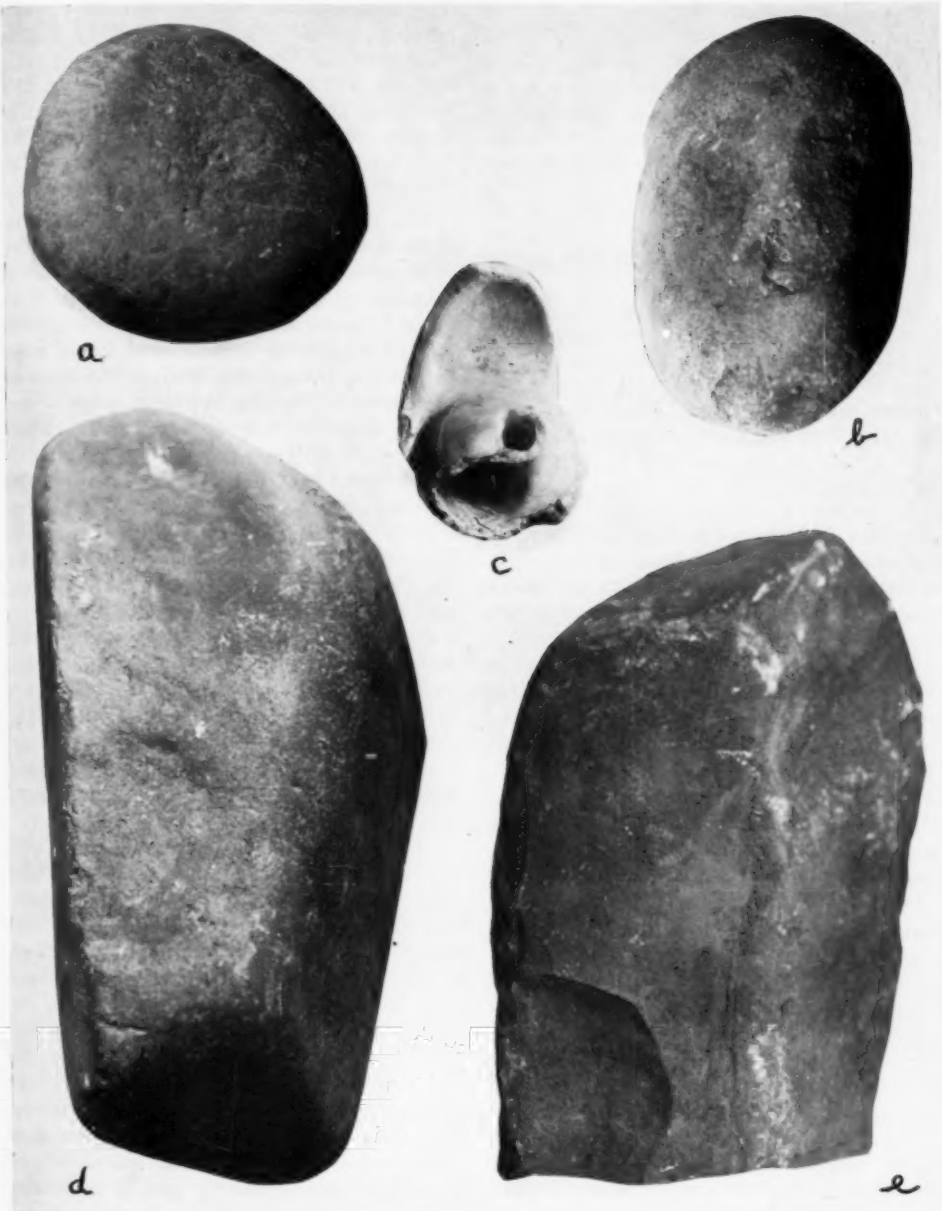

FIG. 37. Tools from the preceramic or Archaic levels of the Loiza Cave, Puerto Rico. *a*, circular pitted hammerstone; *b*, rectangulate pitted hammerstone with one edge (right side) smoothed by grinding; *c*, scraper made from conch shell; *d*, pebble grinder showing grinding surface at left; *e*, pebble chopper showing chopping edge at left. The pebble grinder and chopper are the most distinctive types of this Loiza assemblage. (Dimensions: *a*, 8.5 by 4 cm.; *b*, 11 by 8 by 3.5 cm.; *c*, 10 by 6.5 cm.; *d*, 12.5 by 6 by 4 cm.; *e*, 10 by 7.5 by 4.5 cm.)

countered throughout the lowest level. Four stone artifacts were recovered from the 3rd level, 2 possible examples from the 4th. In addition, at the bottom of this last level in the very top of the sterile sand deposit which began at a depth of approximately 48 inches, were encountered a number of scattered human bones. In spite of the paucity of unmistakable artifacts, the evidence for occupation of the cave by a nonceramic group prior to the advent of the Igneri-phase people in the area seemed almost conclusive.

In July, 1954, a joint Peabody Museum of Harvard University-University of Puerto Rico expedition, under the leadership of Alegría and H. B. Nicholson, resumed work both at the ceramic site and the cave. The following description of the work of this party in the Loiza Cave should be regarded as a preliminary report.

A number of test pits, totaling 56 sq. m., were dug into various portions of the hard-packed floor. In an attempt to refine the stratigraphy, these pits were dug in 10-cm. levels. The material recovered added substantial corroboration to the view that the cave contained a genuine preceramic occupation deposit. Thick concentrations of food remains, mostly animal and fish bones, crab jaws, and shells, together with stratified layers of pure ash, were encountered in nearly every trench, particularly in the lower levels. All pits ended in clean sterile sand, whose light color contrasted markedly with the dark occupation deposit above it.

In some of the pits no sherds were encountered at any level; in others, the topmost 4 or 5 levels contained scatterings of Igneri-phase pottery fragments, always decreasing sharply in numbers with increasing depth. Actual artifacts of stone or shell were rare, but one type, described in detail below, was quite distinctive. Two burials in poor condition, plus fragments of a human skull, were found, all at the top of the sterile sand subdeposit. One of the burials was secondary; the other, found less than a meter away, was primary, extended, and face up. This last was the deepest evidence of human occupation found in the cave; 20 cm. of sterile sand lay between the base of the occupation deposit and the top of the skull, which was encountered at a depth of 150 cm. from the cave floor. These human remains are presently being studied and will not further be described in this preliminary report, other than to mention that the skulls appear to be undeformed. All in all, the 1954 excavations added considerable evidence that at least the front portion of the cave was intensively occupied for a considerable period by a preceramic group.

The Artifacts. In this section all possible artifacts found in both excavations, including those from the upper sherd-bearing levels, will be described together. It seems likely that those found in association with pottery actually belong to the pure preceramic deposit and their presence in these upper levels is the result of disturbance. Typologically the majority are nearly identical to types found in the lower levels, and the small number of Igneri-phase sherds found near the surface does not indicate a genuine occupation of the cave by a pottery-making group. The scattered human bones found in the 1st level during the 1948 excavations suggest that the Igneri people may have occasionally used the cave for burial purposes; it is even more probable that this striking grotto so near the ceramic site was the scene of ceremonial activities.

Stone artifacts will be described first. The most common type (11 specimens), and certainly the most distinctive, is what we have labeled the "pebble grinder." Characteristically it is simply a large, waterworn, irregular, polyhedral pebble of hard fine-grained stone with distinct edges, one or more of which has been worn flat by rubbing or grinding (Fig. 37 d). The implements range from about 12 by 6 by 4 cm. to 6 by 5 by 3 cm. The grinding facets are usually long and very narrow, but in some cases are short and fairly broad. No other evidence of human workmanship is present; they apparently were natural pebbles chosen for their shape. These pebble grinders were found in nearly all levels, but more commonly in the upper ones. The precise function of this unique artifact type is uncertain. One specimen bore a grinding facet apparently stained with some reddish substance. Although red ocher has been reported from other Greater Antillean preceramic sites, none has so far been reported from any possibly preceramic deposit in Puerto Rico. The narrowness of the average grinding facet may indicate a somewhat specialized use.

A possible subtype consists of the same polyhedral pebble form with one entire face, rather than an edge, so smooth that it was apparently the result of rubbing or grinding. It is doubtful whether water action or other natural cause could have produced such a regular, perfectly flat surface.

The second most distinctive stone artifact is the hammerstone (3 certain and 2 probable specimens; Fig. 37 *a*, *b*). Two are irregular in shape, 1 more or less rectangular, 1 teardrop, and 1 discoidal and pitted. Only the rectangular and the discoidal examples show evidence of artificial shaping; all display use nicks on the striking surface.

The remainder of the stone artifacts consist of what we have called "pebble choppers" and sharp edged flakes (3 of the former; 6 of the latter). The pebble choppers are irregular pebbles with a rough, broken striking edge. One of the largest and most complete measures 10 by 7.5 by 4.5 cm. (Fig. 37 *e*). The flakes have sharp cutting edges with use nicks; they may have been employed for both cutting and scraping. Evidence of secondary retouching, or even indubitable primary flaking, was not present on any of these flakes.

One shell artifact was unmistakable, a small scraper manufactured from a "Cobos" shell, found in the pottery-free deposit above the 2 burials (Fig. 37 *c*). The flattish section of the outer whorl of a *Strombus* shell was found at a deeper level in the same pit (80-90 cm.), which is almost identical in shape to a smaller one found in the topmost level of one of the 1948 pits, as well as with examples illustrated by Rouse and Osgood from various nonceramic deposits in Cuba, Haiti, and others in Puerto Rico. While the artifactual character of these "shell plates," as these 2 archaeologists call them, has not been conclusively demonstrated, the wide distribution of this distinctive form makes a good prima facie case. (For a discussion of the possible function and West Indian distribution of these objects, see Osgood 1942: 35, 42.)

Two objects of what appear to be cut bone wind up this somewhat meager artifact list. One, a small stub, was associated with the secondary burial; the other, a manatee rib with a possible pared end, was found on a higher level in the same pit.

COMPARISONS

The West Indies and Venezuela. In Puerto Rico itself, the Loiza Cave pebble grinders might be compared with the pebble "with several grinding facets," which Rouse mentions in his summary description of Coroso culture (Rouse 1952: 335). Later in his description of the artifacts recovered from a shell heap at Jobos, he mentions "two possible grinders of stone" (p. 539); whether his pebble with the grinding facets is one of these is not clear. Unfortunately, none of these objects are illustrated.

The Loiza Cave hammerstones might also be compared with the "pebbles battered on their ends," which Rouse found in some of his nonceramic shellheaps (Rouse 1952: 335, Pl. 8 G). Their simplicity probably rules out any detailed typological comparison. Rouse also illustrates (1952, Pl. 8 *D*) a "*Strombus* shell plate," which, as previously indicated, is almost identical in form to the 2 specimens found in the Loiza Cave; he further mentions the finding of other shell plates in his Puerto Rican nonceramic sites. These objects are also common in some of the ceramic sites.

The Loiza Cave flakes also appear to be very similar to Rouse's "sharp-edged pieces of flint or other stone" (Rouse 1952: 355), but his one illustration (Pl. 8 A) is not adequate for real comparison. In sum, a possible tie between the "Coroso Culture" of Rouse in Puerto Rico and Vieques and the preceramic phase represented by the Loiza Cave material appears to rest more on shared negative features, particularly the absence of pottery, than on clear typological similarities between artifacts that are common to both.

Turning now to the best described preceramic phase in the West Indies, that of Cuba, whose chief diagnostic features were summarized in the introduction, we find that among stone artifacts only the Loiza Cave hammerstones, particularly the discoidal pitted specimen, can be fairly compared with Cuban types. This discoidal pitted type is in fact one of the best diagnostics of the Cuban preceramic; its presence in the Loiza Cave assemblage may be of considerable significance. The Loiza Cave pebble grinder, on the other hand, has no real parallel in Cuba. The Guayabo Blanco phase is distinguished by a lack of either grinders or ground-stone objects, although Harrington (1921 Vol. 2: 340) did mention the discovery

of "thin slender grinding or whetstones" from one site (not illustrated). In the Cayo Redondo phase what Rouse and Osgood call "hammer-grinders" are common, most of which possess grinding facets, but from the published illustrations they do not bear much resemblance to the pebble grinder (Osgood 1942, Pls. 4, 5; Rouse 1941, Pl. 2). Osgood also describes a type which he calls "polishing stone," which from his description and one illustration does seem to bear a generalized resemblance to the Loiza Cave pebble grinder subtype previously mentioned which has one large face completely smooth (Osgood 1942: 30-1, Pl. 4 C).

Harrington also lists as a diagnostic of the Taino (ceramic) phase of Cuba what he calls the "rubbing stone for celt-making" (Harrington 1921 Vol. 2: 299, Fig. 82). Apart from its inclusion in the post-Ciboney ceramic phase, it bears little typological resemblance to the Loiza Cave pebble grinder and was probably employed for a different purpose. The only other Cuban preceramic artifacts resembling those from the Loiza Cave are the previously mentioned shell plates, but the significance of these distinctive but apparently unworked objects found over a large area requires further analysis (compare Osgood 1942, Pl. 3 *H, T*; Rouse 1942, Pl. 2 *P*).

Far more striking than the vague similarities between the Loiza Cave artifacts and those from Cuban preceramic sites, are the absences in the artifact inventory of the former site of a number of types which are important diagnostics of those of the latter, such as: red ocher, mortars and pestles, shell gouges, shell cups, stone balls, retouched stone flakes, and gladiolitos. If further research corroborates these absences in the Puerto Rican preceramic, it will be clear that as between this island and Cuba the archaeological culture content on this early level was quite distinct.

Moving to Haiti, we find that hammer-grinders again are common in the best-known preceramic phase of that country, Couri. They are very similar to those of Cuba and often bear distinct grinding facets, but to judge from the published illustrations (Rouse 1941, Pls. 1, 4, 5), they bear little typological similarity to the Loiza Cave pebble grinders. They especially differ in that the majority seem to have been artificially shaped to a fairly regular form, perhaps more through use than design. Rouse describes another type which he labels "rubbing stone," but these slablike forms also bear little resemblance to the pebble grinder (Rouse 1941: 42, Pl. 1, *16*). As in the Cuban preceramic phases, the number of Couri-phase diagnostics lacking in the Loiza Cave artifact list is much more striking than any casual similarities, for example: the large lamellar flakes with secondary retouching, stone dishes, single- and double-bitted axes, stone balls, beads, gladiolitos, mortars and pestles, and carved shell pendants. The culture contents of the other 2 Haitian preceramic phases have not been fully described, but appear to contain little that can be compared with the Loiza Cave material on a specific level.

The preceramic of the Dominican Republic has only been described in a preliminary way, making comparisons especially difficult. From its geographical position it might be expected to bear a particularly close relationship to that of Puerto Rico. At the base of the preceramic deposit in Railroad Cave in the Samaná Peninsula Krieger found a multifaceted grinding stone similar to those found by Harrington in Cuba (not illustrated). From Krieger's description (1929: 63) and from the fact that he compares it so definitely with the Cuban types, it is probably quite distinct from the Loiza Cave pebble grinder. A number of hammerstones were also found in possibly preceramic deposits in caves by Krieger, some of which he illustrates (1929, Pls. 1, 2), but it is worth stressing again that such generalized artifacts offer little opportunity for establishing cultural connections on the basis of typological similarities.

The putative preceramic of the Virgin Islands (Hatt 1924) has also never been adequately described. Two of the artifacts mentioned, rectangular stone adzes and clam shell scrapers, are absent from the Loiza Cave finds, as is red ocher, also reported from the Krum Bay deposit. Only Hatt's "hammerstone grinder" might offer some basis for comparison, but this type is neither described at greater length nor illustrated.

The nonceramic assemblage of Trinidad has only been described in a very preliminary fashion by Rouse (1953: 94-5); fruitful comparison with the Loiza Cave material is impossible until the final report, in process of preparation, appears. Rouse's preliminary report on the preceramic phase at Manicuare in northeastern Venezuela is somewhat more com-

plete (Rouse 1951b). Manicuare is important because to date it is the only indubitable preceramic assemblage discovered in the southern Circum-Caribbean area. Its artifact inventory appears to bear some typological resemblance to the Guayabo Blanco phase of the Cuban preceramic. With the possible exception of the ubiquitous hammerstone, there seems to be nothing in the Manicuare materials which compares closely with the Loiza Cave assemblage. Final judgment must await the published report, but apparently nothing like the pebble grinder has been found here or elsewhere in Venezuela.

To briefly sum up this comparative survey, it can be said that on the basis of available evidence the most distinctive Loiza Cave artifact, the pebble grinder, seemingly has no close parallels in any comparable West Indian or Venezuelan preceramic phase discovered and adequately described up to the present time. Only the rather nondescript stone flakes, hammerstones, and shell "plates" have some typological counterparts in other areas, mostly in Cuba and Haiti. The absences in the Loiza Cave material of artifacts which are leading diagnostics of preceramic phases of other regions is particularly striking. If future work confirms these absences, as well as the uniqueness of the pebble grinder, it will strengthen Rouse's view of this West Indian preceramic level (1951a: 254-5): "While the various islands are linked together by negative traits, such as the absence of pottery, of agricultural implements, and of ceremonial structures, each differs in its more common positive traits and thereby constitutes a separate cultural unit."

Panama. The similarity of the Loiza Cave pebble grinders and pebble choppers to artifacts of the Monagrillo culture of Panama is surprising and noteworthy. Although these grinders and choppers are crude and simple tool types they are not, apparently, widespread in the Americas. In searching for similarities to the Monagrillo implements (Willey and McGimsey 1954) we were unable to locate any close parallels. The Puerto Rican Archaic occurrence of these artifact types is, therefore, to the best of our knowledge, the only other reported instance outside of Panama.

The Monagrillo pebble grinders and choppers were found in shellmound sites on an old abandoned shore line of Parita Bay in western Panama (Willey and McGimsey 1952: 178, Fig. 9). The Monagrillo cultural phase is, quite probably, the earliest evidence of human occupation yet found in Panama. It is known to precede the later polychrome pottery horizon in the same region, including such cultures as the Coclé. Monagrillo differs from these later archaeological cultures in that it is characterized by extremely simple plain and incised pottery and the crude pebble tools. Further, there is a high probability that the Monagrillo culture was nonagricultural or marginal agricultural as opposed to the intensive farming cultures of Coclé or Veraguas. In sum, the Monagrillo complex represents a relatively early culture of a level of development similar to that of the cultures of the West Indian Archaic tradition.

The Monagrillo pebble grinders, like those from Loiza, are waterworn polyhedral boulders with one edge ground smooth by use. The nature of the grinding work done with these implements, as is the case with the Loiza specimens, is unknown. Several large, crude metates or mortars were found at one of the Monagrillo sites, and the pebble grinders may, possibly, have been used in conjunction with these. It is, however, curious as to why a small edge surface of the stones was utilized rather than one of the larger flat surfaces. The Monagrillo pebble grinders range in size from 17 by 10 by 7 cm. to 11 by 7 by 5 cm. This size range overlaps with the dimensions of the Loiza grinders which are, on the average, slightly smaller than their Monagrillo counterparts.

The Monagrillo pebble choppers are also made from waterworn polyhedral boulders. This type, like the grinder, has one edge shaped from use. In this case the use has been pounding or chopping rather than grinding or rubbing, and, in consequence, the edge of the pebble has been transformed into a rough, bifacially chipped cutting surface. Monagrillo choppers ranged in size from 14 by 13 by 6 cm. to 11 by 9 by 6 cm. The larger Loiza specimens fall within this range.

In addition to the choppers and grinders, the Monagrillo complex resembles the Loiza in the possession of rectangulate hammering or grinding stones. These differ from the more specialized choppers and grinders in that they show evidence of pounding, pecking, and grinding on all edges. This kind of stone tool is, of course, ubiquitous in its American distribution.

Conclusions

There is ample evidence, both archaeological and historical, that the West Indies were first occupied by peoples who followed a non-agricultural way of life. This mode of life has been referred to as the West Indian Archaic cultural tradition. Archaeological sites of this tradition are well represented in Cuba and Hispaniola, and they have been reported from the Bahamas, Puerto Rico, the Virgin Islands, and Trinidad.

The present paper has described excavations in a Puerto Rican cave site which offers stratigraphic proof of a preceramic, presumably non-agricultural, complex underlying the pottery-bearing strata of the Igneri phase. The Igneri phase has been attributed to early agricultural Arawakans.

The preceramic strata in the Loiza Cave yielded abundant crab claws, shells, and animal and fish bones as well as ash. A primary extended and secondary burial, neither accompanied by grave goods, were found near the base of the deposits. The artifacts of the preceramic strata include pebble grinders, pebble choppers, hammerstones, flint flakes with use nicking, a shell scraping tool, a shell fragment, and 2 scraps of bone, possibly cut.

The Archaic culture of the Loiza Cave shows some similarities to the Coroso culture which Rouse has defined tentatively from several sites in Puerto Rico. The plates made of conch shells, the hammerstones, and the flint flakes are shared by Loiza and the Coroso complex. On the other hand, the pebble grinders and choppers of the Loiza type seem to be missing from Coroso. Similarly, in Cuba and Hispaniola the preceramic cultures differ from Loiza in that the peculiar pebble tools are absent. Other grinding stones obtain, but these are of different form. As yet there is not sufficient information from the Virgin Islands, Trinidad, and Venezuela to make adequate comparisons.

The most striking parallels to the Loiza artifacts are seen in the pebble grinders and choppers of the Monagrillo culture of Panama. The Monagrillo implements are identical with those of the Loiza assemblage. The implications of this similarity are by no means clear. The Monagrillo culture of the Parita Bay region of western Panama is a relatively early manifestation, probably preagricultural. It differs from Loiza, and the West Indian Archaic tradition at large, in that it possesses a simple pottery. The location of the Monagrillo sites and the evidence for a marine economy are, however, consistent with most of the West Indian preceramic sites. If the pebble grinding and chopping tools were widely distributed throughout the West Indies and northern South America on an early horizon, a reasonable case for the diffusion of an Archaic tradition and stone tool industry that linked Panama with the rest of the Caribbean could be postulated. Lacking such a distribution we can only remark upon the curious Loiza occurrences of pebble grinders typical of Panamanian Monagrillo. An independent development of this tool type in both Panama and Puerto Rico is not ruled out, yet the artifact is just sufficiently distinctive to give cause for wonder. Is it possible that similar pebble grinders and choppers have been overlooked in the Caribbean area? We call attention to this type of implement, with all the above-mentioned possibilities in mind.

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October, 1954

THE CHALCHIHUITES CULTURE OF NORTHWESTERN MEXICO

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FOR MANY YEARS a Chalchihuites type of culture has been designated for a number of archaeological sites in the western parts of the states of Durango and Zacatecas, Mexico (Hrdlička 1903; Gamio 1910; Noguera 1930; Mason 1937; Brand 1939). The culture takes its name from the early-studied and partially-tested site of the same name located in northwestern Zacatecas.

Chalchihuites culture has been noted by Mason to extend as far south as the great site of La Quemada, or Chicomostoc as it is also called, some 35 miles southwest of Zacatecas, Zacatecas (Mason 1937). It is prevalent in southern Durango in the vicinity of the city of Durango, and Mason and Brand believe that at Zape, Durango, 150 miles to the north, it had reached its northern limit. At Zape it had become peripheral and attenuated, having lost much of its fine quality. As more information is obtained, it is possible that the culture may be extended to a group of sites in northern Jalisco. There are indications that certain elements typical of the culture are found in that locality. Thus, it appears that a Chalchihuites culture province was widespread over a fairly large area east of the Sierra Madre Occidental on the northwestern Mexican plateau.

This brief paper will not redescribe the architectural remains or material culture of La Quemada or Chalchihuites or the sites reported upon by Mason. It will comment upon certain elements that are quite common to the Chalchihuites culture in the vicinity of Durango, and which appear to be typical of the culture generally. Some of these elements were considered by Mason and earlier writers, but warrant mentioning again. A few apparent similarities between Chalchihuites and other cultures will be pointed out.

Our information is based almost entirely upon surface archaeology or collections obtained from the surfaces of several large sites in the immediate vicinity of Durango. Therefore, we possibly group together cultural remains which may prove to have been noncontemporaneous when controlled excavations are undertaken. However, all of the items to be mentioned would appear to have been characteristic of Chalchihuites culture at one time or another, and all are found together on the surfaces of the sites near Durango. Analysis of the collection of Mrs. Agnes M. Howard and an examination of the collection of Frederico Schroeder, both of Durango, furnished most of the information presented here.

Most Chalchihuites sites near Durango are located on the slopes and tops of good-sized hills, over and surrounding which cultural remains are found scattered for several acres indicating former large settlements. Hillside terracing, rectangular house outlines of stones, and a rich assortment of potsherds, stone chips, and artifacts and ornaments of stone, bone, and shell mark the sites. Urn burials of noncremated remains occur.

POTTERY

Potsherds are found in large numbers. Simply classified, they may be divided into 6 types.

Heavy Brown Ware. Sherds of this heavy plain pottery are recovered in such quantity that it is probable that it was the common utility ware. The paste is coarse, with abundant sand temper which ranges in size up to small pebbles. The ware has thick walls which are fairly soft and crumbly. It frequently exhibits a black core. There is a large variation in surface color, ranging from light tan to dark gray. A few sherds of what appears to be the same ware have a dull red slip. Surfaces are uneven and commonly show smoothing marks. A few fragments have a profusion of shallow curved indentations resembling fingernail impressions. Sherds indicate that bowls and large ollas were made. The bottoms of some bowls are incised in a manner suggesting their use as chili grinders or *molcajetes*. Some vessels have large tripod supports and handles or lugs shaped like human heads are attached to the rim of one bowl.

Red on Brown Ware. This is the most frequent type of decorated ware found. There is quite a variation in both surface and design colors. The slip color ranges from tan to brown to almost orange; designs from red to brown. The tan paste is fine and hard, and it shows a black core in many instances. Surfaces are well smoothed and polished over the designs. Polishing over the decoration sometimes causes the design to be blurred.

Vessel shapes, determined from an examination of several complete vessels as well as a great many sherds, include jars or small ollas, shallow bowls, bowls with

* Mrs. Howard collaborated in the study of the artifacts and R. H. Lister is responsible for the discussion and comparisons.

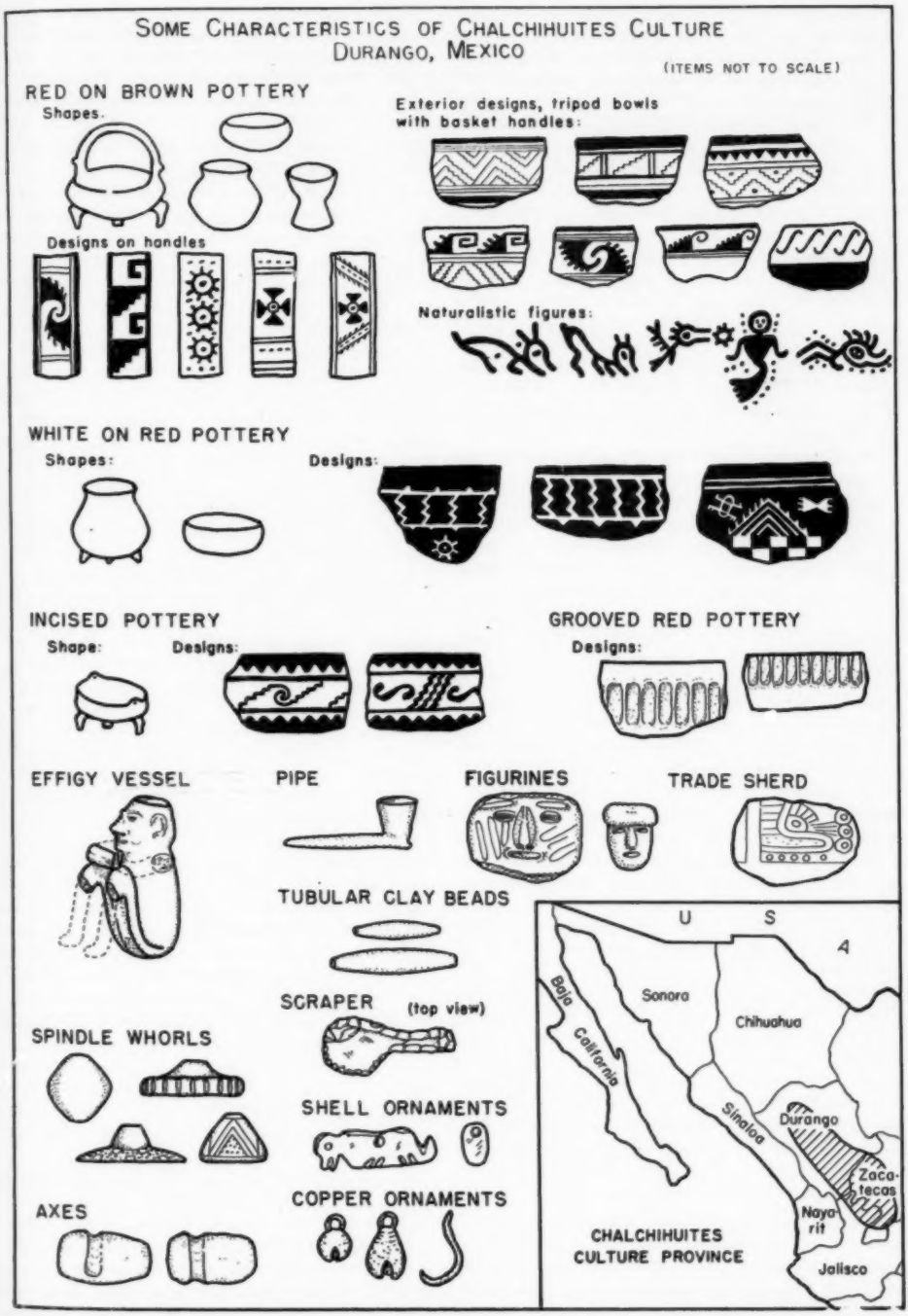
SOME CHARACTERISTICS OF CHALCHIHUITES CULTURE
DURANGO, MEXICO
(ITEMS NOT TO SCALE)
RED ON BROWN POTTERY
Shapes:
Designs on handles
Exterior designs, tripod bowls with basket handles:
Naturalistic figures:
WHITE ON RED POTTERY
Shapes:
Designs:
INCISED POTTERY
Shape:
Designs:
GROOVED RED POTTERY
Designs:
EFFIGY VESSEL
PIPE
FIGURINES
TRADE SHERD
TUBULAR CLAY BEADS
SCRAPER (top view)
SPINDLE WHORLS
SHELL ORNAMENTS
AXES
COPPER ORNAMENTS
U S A
Baja California
Sonora
Chihuahua
Sinaloa
Durango
Zacatecas
Nayarit
Jalisco
CHALCHIHUITES CULTURE PROVINCE

FIG. 38.

annular bases, and a highly characteristic shape — a tripod bowl with basket handle. A typical example of the latter form consists of a shallow bowl, approximately 8 inches in diameter. It has a sharp angular shoulder and is supported by tripod legs. These legs, in profile, are wide at the top because of the presence of a distinctive knob, and taper to a narrow bottom upon which they rest. They are about 2 inches high. Arching above the vessel to a height of 5 inches is a heavy, solid basket handle. It is oval in cross section and about ¾ inch in width. The handle flattens markedly at either side where it attaches to the rim of the bowl. On the exterior surface of the handle, about an inch above the bowl rim on either side, there are small protruding knobs. Naturally there is some variation, especially in size, from the typical vessel described above. Fragments of handles show an assortment of sizes extending from ⅝ to 1¼ inches in cross section. Knobs on the sides of the handles may be modified to form small animal effigy heads.

It appears that tripod bowls with basket handles were decorated only in bands around the exterior sides of bowls and on the exterior surfaces of the handles. Usually rims are red. Below the rim the decorative band, characteristically outlined by 1 or 2 horizontal lines, extends down to the sharp shoulder of the bowl. Within this encircling band are various designs, made up primarily of geometric elements and naturalistic animal figures. Parallel lines, lines edged with ticking, stepped lines, solid triangles or stepped triangles, frets, S-shaped elements, circles, pattée crosses, and dots are placed in various combinations. Naturalistic figures are frequently combined with the geometric motives. The outer surfaces of the basket handles are decorated with designs similar to those placed on the sides of the bowls. The designs extend in a band completely across the handle from one side of the vessel to the other. The knobs protruding from either side of the handles are sometimes incorporated into the depiction of a human face. The knob serves as a nose and the other facial features are painted about it. Shallow bowls, bowls with annular bases, and jars appear to have been decorated only with geometric elements, principally parallel lines. Bowls show both interior and exterior decoration. Brush work is not very neat, and lines vary from fine to fairly broad. However, the over-all appearance of the designs is quite pleasing, and they probably contained considerable symbolism.

Some sherds of red on brown are thicker walled and have broader design lines than have been described above. These sherds apparently constitute a coarse variant of red on brown ware, possibly representing a separate type. However, in this general discussion such a distinction will not be made.

Grooved Red Ware. Sherds of this type are numerous enough in collections to set them apart as a ware. In paste they resemble red on brown. The surface usually has a dull red slip, occasionally showing some polishing. Sherds are from shallow bowls and small jars with an angular shoulder. Tripod legs are employed on at least some bowls. Decoration consists of an encircling band of vertical grooves about the sides of bowls and on the bodies of jars above the shoulders. The grooves are about ¼ inch in width and 1/16 inch deep, and they appear to have been made with a round-ended implement. On jars the grooved band is unslipped, so it stands out in color as well as in texture.

White on Red Ware. Sherds of this ware are not found as frequently as are red on brown sherds. This type has a hard, tan paste, sometimes showing a black core. A fairly well polished red slip covers the smooth surfaces. The white designs are drawn over the polish in a matte paint thick enough to be felt with the finger. Bowls, jars, and rarely tripod bowls with basket handles occur. Some jars have small conical tripod supports. Brush work is fairly neat; lines are usually fine. Decoration seems to be limited to vessel exteriors. Many of the geometric elements used on red on brown ware are also employed on this pottery. Bowls sometimes have a decorated band around the sides just below the rims. Motifs include stepped or zigzag lines, parallel lines frequently arranged in triangles, lines with ticking, circles, and checkerboard. A few small designs may be conventionalized animals or insects.

Incised Ware. This characteristic ware does not occur in great quantity. Its tan paste is the hardest and finest of the wares examined. Walls of vessels are thin and the surfaces are extremely well smoothed and highly polished. Slip color ranges from tan to dark gray, with the latter color predominating. The only shape noted is a small shallow bowl, approximately 5 inches in diameter, with tripod supports. Rims of bowls are often raised and perforated at 2 opposite points, apparently for suspension. The tripod legs are small, 1½ inches in height, and resemble the wide-top style described for red on brown tripod vessels, although the knobs on the upper exterior surfaces are not as pronounced.

Decoration is in a band on the exteriors of bowls, just below the rim. The designs are made by fine incisions, or carvings, most of which appear to have been polished. Red or white pigments fill the incisions, evidently placed after the vessel had been fired since they are fugitive in nature. This practice causes the design or decorated area to stand out distinctly. In some instances the incised lines form the designs, but more often, the incised area serves as the background for a design consisting of unremoved parts of the slip. Thus the incisions comprise a sort of negative element in the design. Motifs such as stepped lines, frets, S-shaped elements, triangles, dots, and some conventionalized animal figures are depicted.

Cloisonné Ware. Perhaps the outstanding element heretofore associated with Chalchihuites culture is cloisonné pottery. Vessels of this very distinctive ware have been recovered at the site of Chalchihuites and at several sites in northern Jalisco. Sherds of this type occur at La Quemada (Ekholm 1942: 94). The ware exhibits a unique technic of decoration whereby designs are

formed by placing a layer of paint on the vessel, cutting out the design, and refilling it with another color. The process is repeated for each color added to the design. As many as 6 colors are utilized in the preparation of intricate designs which included complex symbolic figures.

No examples of this ware were observed in collections at Durango, but reliable informants report its occurrence there. It is rarely recognized on the surface of sites, probably due to the fact that the paint weathers rapidly from sherds once they are exposed to the elements.

Trade Wares. A very few sherds are recovered from sites in the vicinity of Durango which probably represent trade wares. Since the sherds are not numerous, and most of them are quite small, description is difficult.

A polychrome type is present. It resembles red on brown ware, but in addition, has white lines incorporated in the designs. There is also an incised red and white on brown polychrome type on which a very fine-lined design has been cut into a band of red paint encircling the exteriors of bowls.

A single brown sherd has an incised design apparently depicting the head of a feathered serpent. The figure is conventionalized, but it shows a serpent head with open mouth, the eye, and a crest of feathers above the eye.

These trade wares, as well as those which comprise the pottery complex of Chalchihuites culture, suggest strong central Mexican affiliations. Whether such a connection was directly with the central area of Mexico, or with the west coast of Mexico where influence from central Mexico was felt, cannot definitely be stated. This problem will be considered in the final section of this paper.

Spindle Whorls. Several types occur rather commonly. One group is made of fine grained clay. The surfaces are usually well smoothed and polished and vary in color from brown to almost black. They average about 1½ inches in diameter and are decorated with finely incised lines and dots. Incisions possibly had been filled with a pigment of a fugitive nature. Shapes include biconical, conical, and a variation of the conical type which possesses a circular base.

The second group of spindle whorls is not nearly as well made as the first. They are fashioned from a coarse, heavily tempered clay. The surfaces are uneven and poorly polished, usually tan or brown in color. Like the first group, they also average about 1½ inches in diameter. The only decoration is a series of notches around the edges. They are shaped like thick discs with the addition of low conical protuberances on one or both surfaces, making them appear either conical or biconical.

Smoking Pipes. Fragments indicate that an elbow variety was typical. The bowl extends upward, almost at a right angle to the stem. They are made of fine clay, having tan to brown polished surfaces. The stems are short and, in some cases, have a thick oval cross section, flattened on the bottom. In other examples the stem is circular in cross section. Both types of stems taper to a blunt point at the mouthpiece. The front end of the stem is flattened horizontally forming a sort of platform upon which the bowl rests. The platform usually is wider than the base of the bowl. It may simply be rounded in front, or it can have notches which cause the front of the platform to be lobed. Some pipe bowls taper from the opening at the rim to a smaller base, but others appear to have been more globular with an angular shoulder. Most examples have no decoration, but one cylindrical stem has a neatly incised design. A typical pipe measures 3½ inches in length with a bowl 1¼ inches high.

Beads. Tubular clay beads are found in numbers. They vary somewhat in size but all are fashioned in the same manner. It is likely that they were made by rolling flattened pieces of fine clay about hollow grass stems of small diameter. The clay was shaped so that the tube had a larger diameter in the center and tapered to either end. Usually they were polished. The firing process burned out the grass stems, leaving a small perforation extending through the beads. They normally are tan in surface color. These beads average 1¼ inches in length and ¼ inch in greatest diameter. The hole for stringing is 1/16 inch or smaller in diameter.

Effigy. One hollow effigy figure has been collected. It is a seated figure, with legs drawn up in front of the body and knees sharply bent. Arms are folded across the chest, resting on the bent knees. The head and facial features are well modeled and are quite large in proportion to the rest of the figure. Its left cheek has a decided bulge as though something was held in the mouth. The remainder of the bodily features are shown in rudimentary fashion. Sex is doubtful, although possibly it is intended to represent a male. It may have been employed as a container since the top of the head has a large opening. Unfortunately the upper arms and lower legs are missing. It is apparent that the legs were broken while the effigy was being used since the broken surfaces had been ground very smooth. It is brown in color and is moderately well polished. No painted decoration appears, except on the face which had been colored red. Perforations in the ears and nose suggest that ornaments might have been attached to those features. It is 9 inches high.

Figurines. A few fragments of hand-modeled, solid clay figurines have been found. These specimens do not show resemblances to any described types. The heads of some are flat slabs with raised noses and eyebrows and incised eyes and mouths. A red-line decoration is painted on the face. Another variety has coffee-bean type eyes, a raised nose, and protruding lips. An assortment of torsos and legs is in the collections. Most figurines are of brown clay, polished or unpolished. Some carry a red painted decoration.

Stone

An assortment of stone artifacts occur in sufficient frequency to be considered typical of Chalchihuites culture.

Axes. Ground stone axes are very prevalent at sites in southern Durango, seemingly indicating a great emphasis upon wood working. A variety of axes was made; full-grooved and three-quarter grooved types predominate and are found about in equal numbers. Several double-grooved axes have been observed. Most axes have a rounded butt, a slightly convex cutting edge, and are oval in cross section. In size they exhibit a wide range.

Mauls. Round-bitted stone implements, most likely employed as mauls, occasionally are found. Normally they have full encircling grooves for hafting purposes.

Metates and Manos. Grinding tools, undoubtedly associated with maize agriculture, also are common. The metates are troughed, closed at one end as a rule, and legless. Manos are generally rectangular with rounded corners. Both grinding surfaces may be flat and parallel; or one surface may be flat and the other curved. Both metates and manos are of vesicular basalt.

Mortars and Pestles. This style of grinding or crushing device was not nearly as commonly used as the metate and mano. Some mortars are almost cylindrical in outline and well made. Others are much simpler, having been prepared by making a depression in a small rock. A few effigy mortars are known. They sometimes have a human face depicted on the outside of the vessel. Pestles are cylindrical shaped. Basalt was used for both mortars and pestles.

Carved Figures. Another cultural element which appears to be characteristic of Chalchihuites culture was the carving of stone effigy figures. As a rule they are anthropomorphic and not well executed. Most of them were made of basalt or tuff, materials that do not lend themselves to fine detailed work. Frequently only the head and facial features are shown with any degree of reality; other parts of the body are highly conventionalized or not indicated. The objects are usually cylindrical in over-all outline with the upper portion, or head, being rounded. They are fairly small, having a spread in height from 3 to 7 inches.

Projectile Points. Projectile points are numerous. Several types are recognized, but most of the specimens can be placed in one or the other of 2 groups: side notched or side and basal notched. The blades of a number are serrated. Many very small points, averaging about ½ inch in length, are collected. They are so small that their employment as arrowpoints is questioned. Perhaps some may have been used ornamentally. Other examples are as much as 1½ inches in length. A large number of points fall in between the 2 extremes. Various materials such as flint, chert, chalcedony, and obsidian were used.

Obsidian Flake Blades. Single flake obsidian blades, highly characteristic of the central Mexican cultures, are present at Chalchihuites culture sites. From surface indications, they possibly are not as numerous as in areas farther to the south.

Scrapers. A distinctive type of scraper is assignable to the culture. It is shaped like an end scraper, or snub-nosed variety, but has a narrow extension projecting away from the circular working area. It therefore resembles a banjo in shape, being circular with a narrow parallel-sided extension which probably served as a handle. The majority of the specimens are small, about 1½ inches in length. They have flat undersurfaces and are retouched around the edges of the circular portion.

Cruciform-shaped Stones. Small, flat stone objects with 4 projections placed at right angles to one another occasionally are collected. Surfaces usually are well smoothed by grinding and polishing, but a few are shaped by chipping. They measure about an inch across. Use is unknown.

Ornaments. Stone beads and pendants were employed as ornaments. Small disc-shaped beads frequently are found. Less numerous are small, neatly-carved flat beads in animal and human effigy shapes.

Miscellaneous. Polishing stones of several varieties, stone balls, shaft polishers, drills, cylinder stamps, and a number of items of indeterminate shape are found in the collections from sites in this area. Pieces of polished iron pyrites may have been employed in mosaics.

Shell

Ornaments. Shell appears to have been a favorite material from which ornaments were carved. Bracelets were made by cutting the centers from *Glycymeris* shells. Sometimes the umbo was carved to represent a face. An assortment of beads and pendants has been found. Outstanding are flat effigy beads representing human and animal forms. Some such specimens are extremely well executed. A number of ornaments were made from nacreous shells; others were prepared from the less shiny kinds.

Copper

Ornaments. Bells probably were used as beads. They were made by casting, have globular bodies and stone clappers, and appear identical to those found in the cultures of central Mexico. Small hook-shaped objects of copper also may have been used as ornaments since in one instance 6 of them were found about the skull of a burial. Possibly they were used as ear or nose ornaments.

Discussion

As is pointed out several times in the above descriptive account, many of the characteristic Chalchihuites traits were widespread in central Mexico in aboriginal times. The idea that the Chalchihuites province represents perhaps the most northerly extension of the Mesoamerican culture area has been advanced for many years.

Our analysis of material from southern Durango certainly substantiates this concept. A more or less continuous distribution of Mesoamerican cultures can be traced from Durango and Sinaloa southward into Central America.

Chalchihuites culture elements which show affiliation with other cultures of the Mesoamerican area include the following:

1. Red on brown pottery. A tradition for making brown pottery with red decoration seems to have been widely spread over a large part of western Mexico. The distribution of such wares can be traced from Oaxaca to the valleys of Mexico and Toluca, and northward to highland Michoacán, northern Jalisco, Sinaloa, Zacatecas, and Durango. All of the red on brown wares found over this vast area have a certain uniformity of color, designs, shapes, and temporal spread suggestive of some relationship. In fact, even the red on brown wares of the Hohokam and Mogollon cultures of the American Southwest may possibly be included in this tradition, although it is realized that such wares seem to be earlier in the Southwest than in Mexico. In western Mexico red on brown pottery is quite characteristic of the Toltec, or Chichimec, horizon dated in a general way from A.D. 900 to 1200.

Specifically, Chalchihuites red on brown shows a number of similarities with Sinaloa red on buff which is found along the coast of Sinaloa and northern Nayarit. Many of the design elements and the arrangements of designs in a band about the exteriors of vessels are almost identical in the 2 areas (Ekholm 1942: 46-8; Kelly 1938: 18-19, Pl. 7). Many years ago Kelly commented on the basic similarity between Chalchihuites sherds collected by Mason in Durango and red on brown sherds from coastal Sinaloa. She noted that this similarity may prove to be a fundamental bond between the plateau and the coast (Kelly 1938: 42, footnote). Brand also has written of the similarity between the red on brown of northern Durango and the red on brown of the Aztatlán complex (Brand 1939: 102).

2. Cloisonné pottery. The cloisonné technic of decoration, both on pottery and gourd vessels, seems to have had an important center in western Mexico (Ekholm 1942: 94-5). This style of paint decoration also was used in the Valley of Mexico and Yucatan. Where paint cloisonné appears in datable Mesoamerican cultures, it is assignable to the Toltec horizon.

3. Pottery trade wares. Both the polychrome and incised polychrome sherds from the Durango sites resemble wares of the Aztatlán complex of coastal Sinaloa very closely (Kelly 1938: 18-19, Pl. 4). Likewise, a sherd bearing the incised figure of a feathered serpent is suggestive of feathered serpent designs on vessels found at Cojumatlán, Michoacán (Lister 1949: 27-8). The feathered serpent motif employed on pottery is characteristic of the culture of the Mixteca-Puebla area of central Mexico. Mixteca-Puebla influence has been demonstrated to have spread northward from its home in the Puebla-Oaxaca area to the central highlands of Mexico, to the Lake Chapala area, Michoacán, to Nayarit, and to coastal Sinaloa, during the latter part of the Toltec horizon. The Aztatlán complex of Sinaloa contains many elements traceable to the Mixteca-Puebla.

4. Smoking pipes. This is another element in which similarity between the plateau of southern Durango and the Sinaloa coast may be pointed out. The Chalchihuites pipes, both the undecorated variety and the style with incised stem, are strikingly like those from Guasave, Sinaloa, which is an Aztatlán complex site (Ekholm 1942: 83-5).

5. Hollow effigy. Although not known to occur commonly in the Chalchihuites culture, the one specimen examined is reminiscent of large hollow figurines from the Nayarit-Colima area.

6. Copper. Metal working is said not to have reached Mexico until Toltec times. However, once the technics were introduced from Central America, they spread northward throughout the area of Mesoamerican cultures. The Chalchihuites-culture copper ornaments are definitely in the tradition of central and western Mexico metallurgy. Whether they were worked locally or were trade pieces cannot be stated.

7. A number of the Chalchihuites traits cannot be compared with specific Mesoamerican cultures since they are so widely distributed as not to be diagnostic. However, some such items may be listed since they tend to show that Chalchihuites culture is predominately Mesoamerican. Typical elements of Mesoamerican culture found in the Chalchihuites province, which have not been previously listed, consist of such items as: brown utility pottery,

tripod vessel supports, annular bases for vessels, the chile grinder, spindle whorls, clay figurines, and obsidian flake blades.

From the above discussions of Chalchihuites traits it is apparent that the culture flourished, at least in part, during the Toltec horizon which has been dated A.D. 900 to 1200. Some of the outstanding characteristics which have been listed as appearing during this horizon in Mesoamerica include, among others: the appearance of metal, the rise of Mixteca-Puebla culture to prominence, and large scale movements of peoples (Caso 1953).

When the archaeology of the whole of western Mexico is considered, it becomes evident that it was during the Toltec horizon that the most widespread cultural development took place. It appears that during this period many cultural provinces existed in western Mexico. They each had distinguishing features, but also there was an underlying similarity throughout the area which may be explained by tribal movement causing contact, trade, and exchanges of intellectual achievements. The Chalchihuites province was but one of several such cultural manifestations which flourished at that time.

The question of the direction of contacts between Chalchihuites culture and other Mesoamerican cultures should be considered. Were the contacts made directly south along the eastern edge of the Sierra Madre Occidental with the lake region of Jalisco and Michoacán, or was there communication westward with the culture of coastal Sinaloa, which possessed many central Mexican traits? It appears to me that Chalchihuites culture was influenced from both directions, and also to a lesser degree from the north, as will be pointed out shortly. I visualize the basic Chalchihuites culture as having spread from, or having received strong influence from, central Mexico by way of highland Michoacán and Jalisco. Also, I believe that there was considerable communication between the Chalchihuites area and the Sinaloa-Nayarit coast. This, despite the formidable barrier presented by the rugged Sierra Madre Occidental. Several rivers, such as the Vueltes-Culiacán, Remedios-San Lorenzo, Presidio, and Mesquital-San Pedro, cut through the mountains from the plateau to the coast. The valleys and canyons of these rivers could have served as connecting links between the 2 areas. Even routes over and through the mountains should not be overlooked. Today the Huichols walk long distances through these same mountains.

Enough specific resemblances occur between the Chalchihuites culture and the Aztatlán complex of the coast to show cultural contact. It is not believed at this time that Aztatlán culture received its central Mexican traits by way of Zacatecas and Durango, although it is a possibility. A case for the spread of culture, specifically Mixteca-Puebla, from the central Mexican highlands to the west coast by way of the lake country of Michoacán and Jalisco, through the mountains in the vicinity of Tepic, Nayarit, and then up the coast as far as northern Sinaloa has been presented by Ekholm (Ekholm 1942: 130). There is no apparent reason to differ with this concept.

Therefore, the northern spread of culture from central Mexico in Toltec times appears, generally speaking, to have been in the form of a Y. The stem divided in the vicinity of Lake Chapala; the left branch went up the west coast and the right branch stayed east of the Sierra Madre Occidental. Once the influence reached its northern limits in Sinaloa and Durango, a certain amount of intercourse took place over and through the mountains.

Finally, a few observations may be made in regard to Chalchihuites-Southwestern connections. Although Chalchihuites culture is predominately Mesoamerican, a few elements occurring in it are more typical of the Southwest than of Mesoamerica, which may represent influence from the Southwestern area. Since the traits in question appear to be more highly developed in the Southwest than in Zacatecas and Durango, it is felt that the direction of influence was from north to south.

Stone axes may be a Southwestern trait which spread into Mexico; however, both the three-quarter-grooved and full-grooved axes are more widely spread throughout western Mexico than has generally been assumed. Both types are found as far south as the Middle Río Balsas basin of Guerrero. Nevertheless, axes do appear more commonly in northwestern Mexico than in more southerly areas. We have noted the abundance of axes in the Chalchihuites culture. This fact, especially in light of the scarcity of celts which were commonly used as wood working implements in Mesoamerica, points to the presence of the ax in the Chalchihuites province as being due to Southwestern influence.

Shell ornaments are abundant in the Chalchihuites area. Shells also were used extensively for ornaments at Guasave, Sinaloa. Ekholm has shown several likenesses to exist between the Guasave shell work and that of the Hohokam culture of southern Arizona, and he believes that certain shell carving styles, and perhaps the idea of using shells as a medium, may have come from the Southwest (Ekholm 1942: 109-11). In the Chalchihuites shell work also there are resemblances to that of the Hohokam. The circular bracelets with carved umbo and the well-formed human and animal effigy beads especially correspond to those found in the Southwest and probably indicate connections between the 2 regions.

The practice of painting small naturalistic human and animal figures on red on brown pottery in the Chalchihuites province also is reminiscent of the Hohokam culture of the Southwest. The designs are not identical, but the Durango examples are suggestive of those of the Hohokam.

Once again the question of the route of contact arises when Chalchihuites-Southwestern connections, or the larger problem of Mexican-Southwestern connections, are considered. Ekholm's survey in Sonora has shown that a west coast corridor does not seem a likely route, unless it is assumed that traits were transferred by travelers or traders who crossed great areas inhabited by peoples of relatively low culture (Ekholm 1942: 136). On the basis of present information, the plateau area of Chihuahua does not seem to have been the route. Might the great mountain range of western Mexico, the Sierra Madre Occidental, have served as a corridor for the spread of cultures both north and south? Such mountainous masses usually are considered to be barriers to movement rather than corridors, but in dealing with aborigines who were great foot travelers, would the mountains have been such a great barrier? They have a north-south axis with many longitudinal valleys, contain permanent water, and are cooler than the areas on either side because of the greater elevation. Could aborigines have used the mountains for communication purposes, and spread out onto the adjacent plateau and coast for permanent settlement?

The problem of correlating certain cultural elements common to the Southwest and Mexico, including those mentioned in this paper as well as others, is becoming less difficult as the Mesoamerican chronology is pushed back in time.

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June, 1954

A REVISED CLASSIFICATION OF THE PREHISTORIC CULTURES OF MINNESOTA

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IN THE FIRST classification of the prehistoric cultures of Minnesota (Wilford 1941), no attempt was made to present a chronological sequence, though some temporal relationships were indicated. Since that time the efforts of archaeologists in all parts of the eastern United States in excavating sites and in reporting the results, in pooling their knowledge at regional conferences, and in constructing and publishing cultural sequences for regions and for the entire area, have crystallized in a framework in which the 3 major cultural groupings, the patterns, have been fitted into a chronological sequence of 4 periods. It is now possible to place the Minnesota cultures in this framework with a fair degree of confidence. Table 6 presents this placement in terms of the categories of the Midwestern Taxonomic System.

THE ARCHAIC PERIOD

Archaic manifestations in Minnesota are limited to the early part of the period to which are ascribed the Minnesota Man, the Browns Valley Man, the Little Falls workshop, and possibly the Sauk Valley Man. All of these have been previously reported. The only new development is an attempt to date the Minnesota Man site by the radiocarbon method. An assay of the elk-antler dagger which accompanied the skeleton indicated the presence of enough carbon to permit use of the method. A section of the antler was with difficulty cut out with a hacksaw, but its carbon content proved to be almost entirely of inorganic carbonate, attesting to the high degree of mineralization of the specimen, and inadequate for a determination of age.

THE EARLY WOODLAND PERIOD

Accepting the Early Woodland period as a pre-Hopewellian horizon, in which occur the simple Woodland pottery types presumably derived from northeastern Asia, and which lacks evidence of the specialized Hopewellian traits in pottery, artifacts, or burial customs, the only Minnesota site that can safely be ascribed to the period is the La Moille rock shelter. At this site was a cultural deposit 15 feet deep in which fish bones and fire hearths were everywhere present. Potsherds were found above the 9-foot level and one sherd was found at the 6-foot level. Six stemmed projectile points were found above the 1-foot level. The largest point, 68 mm. in length, is shouldered and stemmed with a straight base. The most interesting point was from the 5-foot level. It is nonstemmed with a concave base, and is 44 mm. long.

Many of the sherds belonged to a single heavy cooking vessel. As restored by Leland Cooper of Hamline University, the vessel is 32 cm. high and 27.4 cm. wide at the mouth. It tapers from mouth to base, but is a truncated cone, rather than pointed, for at the bottom is a small, slightly convex base. The vessel is 10 mm. in thickness and has 3 pairs of drilled holes near the top. These are not so placed as to suggest holes for suspension. Rather they suggest lace holes on both sides of cracks. The external surface and lip have coarse cord-wrapped paddle impressions, and the inner surface everywhere has irregular cord markings suggesting the use of a frame or of a corded anvil in construction. The only decoration is a line of punctates along the middle of the flat, square lip.

Several sherds from a thinner vessel, 6 mm. in thickness, were present. This vessel has cord-wrapped paddle markings over which is a design in incised lines. In the Middle Woodland period this type of decoration is found in southern Minnesota, but is virtually absent in other parts of the state.

THE MIDDLE WOODLAND PERIOD: HOPEWELLIAN PHASE

In Minnesota, sites of the Middle Woodland period are ascribed to the Hopewellian phase solely on the basis of the pottery. No site is yet known in which such characteristic Hopewellian artifacts as platform pipes, copper breastplates, and copper-sheathed gorgets and ear spools occur. Pottery decoration in which dentate stamping and incised lines are associated in alternate area designs, crosshatched rims, and rows of bosses (beads, nodes), often with single large punctates between the bosses, are accepted as diagnostic of Hopewellian pot-

tery. Common to this type of pottery in Minnesota is a distinct bevel at the inner lip.

The type site is a habitation site on the Anderson Farm at Howard Lake, about 25 miles northeast of Minneapolis. Formerly this site was classified as of the Mille Lacs aspect (Wilford 1941; 1944). The majority of the sherds from the site are indistinguishable from Woodland pottery. As 21% of all rim sherds have a bevel at the inner lip, this figure may be taken as an estimate of the proportion of Hopewellian types present. Seventy percent of all body sherds have cord-wrapped paddle markings, and 30% have plain surfaces. Of 52 projectile points recovered, 8 are triangular and 44 are stemmed. The only objects of copper are 5 gorges, pointed at both ends.

Across the lake from the village site is a group of 3 large mounds. Such a group is distinctly unusual in Minnesota where a mound group

TABLE 6. CLASSIFICATION OF LATE PREHISTORIC CULTURES OF MINNESOTA.

Period	Pattern	Phase	Aspect	Focus	Some Components
LATE WOODLAND	MISSISSIPPI	UPPER	ONEOTA	ORR	RUSHFORD
					HOGBACK
				BLUE EARTH	HUMPHREY
					BARTRON
			—	SILVERNALE	SILVERNALE
		PLAINS	—	CAMBRIA	CAMBRIA
			—	GREAT OASIS	GREAT OASIS LAKE
			HEADWATERS LAKES	BLACKDUCK	BLACKDUCK LAKE
					OSUFSEN
			RED RIVER	ARVILLA	ARVILLA, N.D.
					De SPIEGLER, S.D.
				KATHIO	AQUIPAGUETIN Is.
MIDDLE WOODLAND	WOODLAND	LAKE MICHIGAN	MILLE LACS	MALMO	MALMO
					KERN
			RAINY RIVER	LAUREL	SMITH MOUND #4
					McKINSTRY
			SO. MINN.	—	FOX LAKE
			EFFIGY MOUND	—	—
		HOPEWELLIAN	—	HOWARD LAKE	ANDERSON
				—	TUDAHL
EARLY WOODLAND		—	—	La MOILLE	La MOILLE
ARCHAIC					

containing one or more large mounds commonly has a greater number of small mounds. One mound was excavated and yielded a large number of sherds from the mound fill, virtually identical with the pottery of the village site. In a pit below the base of the mound were multiple secondary burials in an extremely poor state of preservation. They were unaccompanied by grave goods, in which respect they clearly differ from the Wisconsin Hopewell at the Trempealeau site on Minnesota's eastern border.

Other sites at which Hopewellian pottery types occur are the Harvey Rock Shelter on the St. Croix River near Stillwater, and the Tudahl Rock Shelter in the Root River valley. In the latter site sherds with plain rocker stamping and dentate rocker stamping, associated with Woodland sherds decorated with punctates and single cords, occur with and below an Oneota manifestation. The rocker stamped sherds may be associated with the Trempealeau site, which is not far from the mouth of the Root River. An Oneota component was also present at the Harvey shelter, but the stratigraphic relationship of the 2 components was not ascertained.

The Middle Woodland Period: Lake Michigan Phase

The Effigy Mound Aspect. Winchell (1911) listed 12 groups containing effigy mounds, and an additional single effigy, in the first 4 counties bordering the Mississippi River from the Iowa state line north. A thirteenth group was in Scott County. All 13 groups contained round and/or linear mounds in addition to the effigies. None of these mounds has been dug by the University of Minnesota, and at the present time not one of the effigies can be identified.

Martin, Quimby, and Collier (1947: 303) in summarizing McKern's report on the Effigy Mound aspect in Wisconsin, place the culture in the Hopewellian and Middle Woodland periods. McKern (1931: 384) identifies it as belonging to the Lake Michigan phase. Beaubien (1953: 65) finds an admixture of Hopewellian and Effigy Mound traits in effigy mounds of northeastern Iowa. It may be assumed that the Effigy Mound aspect in Minnesota is much the same as in Wisconsin and Iowa.

The Southern Minnesota Aspect. In the 1941 classification the name "Southern Minnesota Aspect" was explained as adopted solely for

Table 7. Types of Surface Treatment and of Rim Decoration of Sherds of Six Woodland Foci, Expressed in Percentages of Occurrence.

FOCUS Component	HOWARD LAKE Anderson	(SO. MINN) Fox Lake	LAUREL Pike Bay	MALMO Malmo	KATHIO Aquipaq-uetin Id.	BLACKDUCK Blackduck Lake
BODY SHERDS						
PLAIN or SMOOTH	30.0	6.5	98.7	87.8	17.5	2.4
CORD-WRAPPED PADDLE	70.0	93.5	1.3	10.2	77.5	78.2
RIM SHERDS						
CORD-WRAPPED STICK	18.4	30.0	0.6	33.3	50.9	57.0
DENTATE	30.3*	3.7	32.3*	7.7	20.1	0.7
PUNCTATE	14.8	24.9	4.2	13.5	14.2	69.7
INCISED LINE	25.6	30.3	2.4	22.9	6.1	0.6
SINGLE CORD	1.1	7.7	.0	0.3	0.3	0.3
BOSSES	3.3	9.5	5.8	12.1	0.2	.0
PUSH-and-PULL BANDS			39.4	8.3		

*INCLUDES THE MEANDER VARIANT OF DENTATE

convenience, and not as designating a true cultural unit. But because the few excavations made in the area since that time have shown that some cultural uniformity does exist, the name is being retained for the present.

The Fox Lake site in western Martin County is the best known habitation site of the area. Additional work there has to some extent modified the earlier presentation of the types of pottery decoration. The principal decorative impressions on rim sherds in their order of frequency are incised lines, cord-wrapped stick, punctates, bosses, single cord, and dentate; and 93.5% of the body sherds have cord-wrapped paddle markings. The high frequency of the cord-wrapped paddle surface treatment differentiates this site from the Malmo and Laurel foci, in which body surfaces are usually plain. Incised line decorations commonly occur over cord-wrapped paddle markings, sometimes in designs other than simple parallel lines, and in both traits resemble some La Moille Shelter sherds. The use of single cord is much greater than at other Minnesota sites, with the exception of the Tudahl Rock Shelter. The incised line and the single cord impression serve to link Fox Lake in the west with the 2 cave sites in the east. In the Late Woodland period the single cord impression is found in the Type B sherds of the Cambria site in southern Minnesota, and much more commonly in the Plains Mississippi sites in Nebraska and the Dakotas. The frequency of bosses is comparable to that of other Woodland pottery of the period, but both bosses and single cords are negligible in the Kathio and Blackduck foci of the Late Woodland period, as shown in Table 7.

Burials of the aspect are not well known, for though several mounds have been excavated many of them have proved sterile, and in the remainder the skeletal material has been found to be in a very poor state of preservation. The mounds have in common multiple burials in a shallow pit beneath the center of the mound, with little or no grave goods. Burials in the Hanel and Judson mound groups, on the Minnesota River between Mankato and New Ulm, were primary; whereas those in the Lake Shetek group in Murray County, near the southwestern corner of Minnesota, were secondary. In all 3 groups not over a handful of potsherds was found. Twenty-four of 27 body sherds from the Lake Shetek Mounds have cord-wrapped paddle markings, and the 2 decorated sherds both have single cord impressions. The Hanel and Judson mounds yielded only 2 sherds, both cord-wrapped paddle body sherds.

The Fox Lake site yielded 1 triangular and 6 stemmed arrowpoints. The Shetek mound had 2 leaf-shaped, nonstemmed points, 2 stemmed points, and 1 triangular point with side notches.

The Rainy River Aspect. The Rainy River aspect is still known only from mound excavations, though the mound fills are rich in artifacts and other village debris, as they are built over earlier habitation sites. Since 1941 the known area of the culture has been extended by excavation of a Laurel focus mound at Pike Bay on the south side of Lake Vermilion, so it is no longer limited to the immediate vicinity of the Rainy River.

Smith Mound 4 at Laurel contained the skeletal remains of about 112 individuals. The mound was cumulative, with massed burials at the center in 4 successive tiers. Almost all of these were bundle burials with the long bones parallel to one another in a small pile, and with the skull at one side or end of the pile. But the bundles do not represent true secondary burials, for a part of the occipital bone had been deliberately removed from each of several skulls, and very many of the long bones had been mutilated by smashing through the outer wall into the marrow chamber at one or both ends of the bone. Seventy-two of 77 adult femora had been so treated. As such treatment was apparently for the purpose of securing the brains and marrow, it can be concluded that the mutilations occurred at the time of death, and that the bodies were disarticulated and the flesh removed as part of the process. It is probable that the long bones and skulls were then saved until the accumulation justified adding another layer to the mound.

Four primary burials were found in the top and sides of the mound. At the legs of one was a pottery vessel of Blackduck type, and 2 other Blackduck vessels were found at the top of the mound, though not directly associated with a burial. A fifth primary burial at the outer edge of the mound, was a complete torso with bones of the hands and feet, and both patellas present. With this skeleton was a restorable vessel of the Laurel type. The 4 primary burials are believed to be intrusive burials of people of the Blackduck culture. As

the torso burial had all the bones that were not commonly included in a bundle burial, and was accompanied by a Laurel-type vessel, it is credited to the people of the Laurel focus.

McKinstry Mound 1 at Pelland yielded the least mixed specimens of the artifacts and pottery of this culture. There were 29 socketed antler points, in the form of an elongated cone hollowed out at the base, with a perforation above the end of the socket. Twenty-five beaver teeth were cut obliquely across the front or labial surface at the distal end of the tooth to terminate in a sharp point. Objects of copper included a small open bracelet perforated at both ends, awls of rolled sheet copper, tubular beads, various pieces of strap and sheet copper, and short lengths of copper with ends bent to form prongs. Other copper objects present in Headwaters Lakes mounds are small thin knife blades, gorges, and flat rectangular pieces that may have been used as ornaments on clothing. In McKinstry Mound 1 were 3000 rather thick disc beads of shell in 2 necklaces averaging 100 beads per foot. A total of 128 objects of chipped stone included 42 end scrapers and 12 arrowpoints all of which were of the stemmed variety.

Laurel pottery vessels are conoidal in shape with pointed bases. The upper body contracts to a wide mouth, with no true neck. Surfaces are plain, some with a slight degree of polish, and the decoration extends downward from the rim for varying distances. A common type of decoration was made with a notched stamp, probably wooden, possibly of stone. The stamp may have been notched at regular intervals by a cut of uniform width from edge to edge which imparted to the clay vessel a series of end-to-end rectangular or square depressions, now known as dentate, but previously also known as roulette. If the notch was cut wider and deeper at one edge than at the other, the resulting impressions are somewhat triangular. However, if the cuts at one edge were made only part way across the stamp and alternated with similar cuts at the other edge the resulting depression is that of a continuous meander. The last has previously been labeled "wavy line stamped" (Wilford 1950a: 166), but in Table 7 is included with dentate decoration, for though the resulting impressions are quite dissimilar, the methods of producing the true dentate and the meander variant were very much alike. A few specimens of both the triangular and meander variants are found in both the Howard Lake and Malmo foci, but at Pike Bay 5.5% of all rim sherds have true dentate stamping, 4.0% have the triangular variant, and 23.1% have the meander variant.

The most common decoration of Laurel vessels is the horizontal "push-and-pull" band encircling the vessel. It may have been made by a straight-edged implement or by one with a notched edge. Of Pike Bay rim sherds, 22.8% have the former decoration, and 16.6% have the latter. Both types are also found at Malmo. Incised line decorations are simple parallel lines, sometimes horizontal, but often as short lengths of parallel vertical or oblique lines in horizontal bands.

The pottery is strongly characterized by the lack of cord impressions either as surface treatment or decoration. The few occurrences noted are believed to represent intrusive sherds.

The Mille Lacs Aspect, Malmo Focus. The culture of the Mille Lacs aspect is difficult to segregate and define, for its burial practices encompass nearly all the known Woodland varieties, and its ceramics exhibit all of the common Woodland traits of surface treatment and of upper body and neck decoration. It is set up largely on the basis of historical knowledge of the Sioux Indians. At the first French contacts Mille Lacs was the home of the Mdewakanton tribe, which had pottery and practiced scaffold exposure of the newly dead, followed by secondary burial in mounds. Sometime near the middle of the 18th century the Sioux were driven from the Mille Lacs area by the Chippewa, who possessed no pottery and practiced primary interment in graves, not in mounds.

In the Mille Lacs area are many sites with pottery, and there are many mounds in which the prevailing mode of burial is the secondary burial of a bundle of bones. Excavation of both sites and mounds has revealed a fairly uniform culture, indicating the probability that a single group had inhabited the area for a long time; and as the Sioux are the only known pottery making people of the area, and practiced secondary burial, it is believed that they are the creators of both the mounds and the pottery.

It was early recognized that the sites differed in the manner of surface treatment of the pottery, with plain body sherds dominant at some, and cord-wrapped paddle markings dominant

at others. Associated with the latter were small triangular arrowheads, and an infrequent occurrence of shell-tempered pottery. No site has been studied showing a clear-cut stratigraphy, but at the Aquipaguetin Island site the ratio of plain sherds to cord-wrapped paddle marked sherds was 34.1 to 65.9 in the lowest level, 24.9 to 75.1 in the middle level, and 14.9 to 85.1 in the top level.

Sites with predominantly plain-surfaced sherds were made the basis of the Malmo focus from the mound group at Malmo excavated under the supervision of Gordon Ekholm in 1936 (Wilford 1944: 333). Burials at Malmo were typical bundle burials, and in one mound a layer of logs had been placed over the burial. Triangular points constituted only 16% of all points recovered. Near Aquipaguetin Island is an older shore line of Lake Onamia on which is a mound associated with a small village site, the Kern site. Plain-surfaced sherds from the village site constituted 98.5% of all body sherds, and the arrowheads were all stemmed or notched types. The mound yielded only a handful of sherds, all plain-surface body sherds. At the original ground level a layer of logs had been laid parallel to one another, with a second layer above at right angles to the lower logs. On this cribwork human bones had been placed, and the logs set afire. But as many of the logs were still present as charcoal and many of the bones were not completely burned it is probable that dirt was thrown upon the fire before it had burned itself out.

No restorable vessel was obtained at the Malmo site. Some sherds are parts of pointed bases. Some of the large rim sherds indicate vessels with little or no constriction of the upper body, others show definite constriction, and some show true necks which meet the upper body in a curved line rather than at a sharp angle. A restored vessel from a mound near Frazee in Otter Tail County, is almost conical, with a pointed base and no constriction of the upper body. It has a plain surface and no decoration and probably represents an extreme Malmo type.

Table 7 presents the principal types of rim decoration of malmo sherds, and shows that malmo pottery has an intermediate position between Howard Lake and Laurel wares and is clearly Laurel's closest relative in Minnesota. At Malmo 16% of the arrowheads recovered were of the triangular type; at Howard Lake this type comprised 15% of the total; and in the small sample from McKinstry Mound 1 none was triangular.

THE LATE WOODLAND PERIOD: LAKE MICHIGAN PHASE

The Mille Lacs Aspect, Kathio Focus. The Mille Lacs aspect is conceived as a culture continuum which at an early stage is represented by a certain combination of traits which constitutes the Malmo focus. The passage of time brought minor modifications eventually resulting in the Kathio focus as an end product. Among these modifications are a change from plain-surfaced vessels to cord-wrapped paddle markings, together with a much less frequent use of incised lines and a virtual discontinuance of bosses and push-and-pull bands in the decoration of necks and upper bodies. The University collection has no complete or restored vessel of the Kathio focus for comparison of shapes, but among the body sherds there are no pointed bases, and many of the large rim sherds indicate definite necks meeting the upper body at a well-defined angle. At some Kathio sites there is a small percentage of sherds with shell tempering, indicating contacts with people of the Mississippi cultures, probably Oneota. The shell-tempered sherds are for the most part not intrusive Oneota sherds, but are believed to be the attempts of Kathio potters to copy Oneota models, or to adopt the Oneota method of tempering. Another Malmo-Kathio difference is to be found in the gradual replacement of stemmed arrowpoints by the smaller triangular points. The triangular points are dominant in all Woodland cultures of the Late Woodland period in Minnesota, and are a marker for this horizon.

If there are changes in the burial customs that are correlated with modification in pottery traits and arrowhead types, they have not yet been demonstrated. There is, or once was, an enormous number of mounds in a wide belt crossing the state westward from a line joining the mouths of the St. Croix and St. Louis rivers. Several mounds of this area have been excavated, and though most of them can be assigned to the Mille Lacs aspect, it is very often impossible to assign them to one of the 2 foci. As the absence of artifacts associated with burials is a trait of the Mille Lacs Aspect, and as most mounds either yield no potsherds or yield an insignificant number of them, the

cultural associations are inadequate as aids in the focus identification of such mounds. In the few mounds which have been identified as to focus, primarily on the basis of the pottery and arrowheads, the burial traits are apparently the same in both groups. Though secondary bundle burial on the original surface is the characteristic form of both foci, burials with some bones or all bones in proper anatomical relationships are found in each group. Also found in both groups are shallow burial pits, uncharred logs over bones, charred logs over and/or under bones showing varying degrees of incineration or none at all, small stone cairns on mound floors, and parts of animal carcasses in the mounds.

Because of its rather generalized Woodland traits, and its wide range of pottery decorations and burial practices, the Mille Lacs aspect as defined here may be somewhat of a Woodland "catchall." It is distinguished from other aspects not so much by diagnostic Mille Lacs traits as by the more sharply defined traits of the others, such as the Rainy River, Headwaters Lakes, and Red River aspects. But the Southern Minnesota aspect, itself poorly defined and rather generalized, does not contrast strongly with the Mille Lacs aspect, and there is often doubt as to the correctness in attributing a mound to one of the 2 aspects. The traits of the Lake Shetek mounds, for instance, are bundle burials in a shallow pit, associated with a few body sherds with cord-wrapped paddle markings, 2 decorated sherds with single-cord impressions, and 5 arrowpoints, only 1 of which is triangular. All of these traits are found in the Mille Lacs aspect, but the site is assigned to the Southern Minnesota aspect, perhaps mistakenly, because of the particular combination of traits.

The Kathio focus is assigned to the Mdewakanton Dakota and is projected backward in time to include the Malmo focus in a common Mille Lacs aspect, thereby inferring that the aspect represents the culture of the Dakota. Until more is known about the distribution of the culture in both time and space it is premature to infer that the aspect represents the culture of all the Dakota tribes during the period of its duration, or to infer that it is limited solely to the Dakota.

The Headwaters Lakes Aspect. A few sites of the Blackduck focus have been excavated since 1941, and though nothing has been found which would alter the list of traits most characteristic of the culture, some re-interpretations of the focus have been made.

The pottery is distinctive in that decoration is confined almost solely to cord-wrapped stick impressions, and to deep, smooth, circular indentations or large punctates. Large cooking vessels are globular with wide mouths, short necks, and thickened lips. Bodies commonly show treatment with the cord-wrapped paddle, but nearly 20% have impressions of a net or other fabric. A majority of the necks have fine, vertical, parallel striations or brush marks on which the cord-wrapped stick impressions are superimposed. The small mortuary vessels exhibit a wide range of shape, and differ from the cooking jars in both surface treatment and decoration. Projectile points are triangular, or triangular with side notches, though some stemmed points occur. Unilaterally barbed harpoons, bone awls, spatula-shaped sections of bone, and antler-tip flakers are present.

Burials are primary, flexed, often in a sitting position, and occur in graves at a village site, but more commonly occur in mounds. Mortuary vessels accompanying burials are relatively frequent.

Excavations of sites at Mud Lake and at White Oak Point on the upper Mississippi River indicated that the Blackduck burials there were preceded by manifestations of generalized Mille Lacs aspect traits more like the older focus, the Malmo focus, and that they were succeeded by later manifestations of that aspect, the Kathio focus. There is adequate evidence that the Headwaters Lakes aspect is later than the Rainy River aspect in sites along the Rainy River. As a result of the White Oak Point study, the suggestion was made (Wilford 1945a) that both the Blackduck and Kathio cultures might have developed from the older Mille Lacs complex, and that the Blackduck people moved northward from the Mississippi area, and were succeeded by Kathio people. It was further suggested that the people of the Blackduck culture might be the historical Assiniboine, originally a Sioux tribe. Potsherds characteristic of the Clam River focus, loaned by W. C. McKern for study, show a strong resemblance to Blackduck sherds, and apparently Blackduck vessels resemble Clam River more than they resemble Kathio vessels. McKern believes that Clam River is a culture

of the historic Sioux (Martin, Quimby, and Collier 1947: 313).

In the 1941 report the burials of McKinstry Mound 2 on the Rainy River were described as primary with the bodies usually in a flexed position, sitting or kneeling, though some of the skulls had been mutilated by removal of a portion of the occiput, or by removal of the eyeballs and placing clay plugs in the orbits. Many of the bodies were accompanied by small mortuary vessels, a Blackduck trait, but because of the skull mutilations it was concluded that "these burials probably belong to people of the Laurel Focus" (Wilford 1941: 241), and the mortuary vessels were also ascribed to that focus. The subsequent study of the sherd distributions by squares and levels, proved this conclusion to be erroneous (Wilford 1950b). The study showed that a small mound had been erected by Laurel people, which had been lengthened and heightened by Blackduck people, and that the burials were all in the mound additions. The skull mutilations and the building of fires above some of the burials are traits not encountered elsewhere in Blackduck mounds. The mortuary vessels must be classed as Blackduck, though they differ in many respects from the rather uniform traits of the large cooking vessels. The 1941 description of the Laurel pottery was derived in part from traits of the mortuary pottery of this mound, but it is now clear that the inclusion of the mortuary pottery was incorrect.

The Red River Aspect. Several mounds of the Red River aspect have been dug since 1941 and have contributed to a more complete knowledge of the culture. It can no longer be said that all of the burials are under mounds in pits dug into the former beaches of Glacial Lake Agassiz, for burials in the most extensive burial site now known were in pits dug into gravel but not under mounds. They were on top of the bluff at Browns Valley in a glacial deposit, but not on an old beach. It is perhaps incorrect to say that "burials are characteristically primary, most often in the sitting position" (Wilford 1941: 243), for, though such burials are common, there are many primary burials flexed in varying degrees, on side or back, partially reclining, or fully extended, as well as secondary and disarticulated burials. Several forms may occur in one mound or even in a single burial pit. Skulls and arms appear to be the principal objectives in disarticulation. At Arvilla a complete set of arm bones was interred very close to a primary burial, which even after exposure sat fully erect. In another pit were 2 complete crania, each with its atlas vertebra in place, and each with a complete set of arm and leg bones. At Browns Valley (the De Spiegler site) the most common burials were primary burials lacking skulls and arm bones, and secondary burials consisting of skulls and arm bones. Artifacts were commonly placed with the latter, not the former. Secondary burials are found in several mound groups, but only at the Red Lake River Mounds was this the principal type. Here the bones were not even in bundle arrangement, so in burial traits this is the most aberrant group of the focus, though it is geographically closer to Arvilla than any other Minnesota group.

The outstanding trait of the focus is the presence of grave goods of bone, antler, teeth, and shell. Bone objects include awls, long pins, arm bands, tubular beads and whistles, and unilaterally barbed harpoons, with multiple barbs cut in a characteristic and unusual manner. Antler objects include cork-shaped objects, a chisel, a bell-shaped tubular pipe, and an unusual haft of elk antler. Perhaps most interesting are the antler tines perforated near the middle for the insertion of beaver teeth. These have now been found at several sites, and are also reported for the Point Peninsula focus of New York and the Intrusive Mound culture of Ohio. Bear tooth pendants and necklaces of wolf or dog teeth are present. The use of shell is a diagnostic trait, for the thick barrel-shaped beads cut from the columella of the conch are found at nearly every site. Whole clam shells with suspension holes, trapezoidal sections, and flat disc beads resembling washers, cut from clam shell are common; and snail shell beads decorating a garment were present at one site. Strangely enough a very close parallel to this inventory of ornaments is to be found in the Indian Knoll culture of the Archaic pattern (Martin, Quimby, and Collier 1947: 261). Copper objects, not plentiful, include 2 large knives or spears one of which is socketed, 2 large crescent shaped ornaments, and an imitation shell.

Though more pottery, including 2 restored vessels, has been found, the quantity is still inadequate to type the ceramic traits. All of the common Woodland surface treatments and methods of decoration are present, though 2

variants may be significant. Dentate stamping is apparently used more than cord-wrapped stick impressions, and cord-wrapped paddle impressions are often horizontal or slightly oblique at the rim, rather than vertical. Dentate stamping may be superimposed over vertical cord-wrapped paddle markings, where these extend to the rim, but punctates are used over horizontal markings. The 2 restored vessels were associated with burials. They are squat, with pointed bases and with relatively long necks and wide mouths. Both have cord-wrapped paddle markings, one horizontal and one vertical, but the necks are smoothed and decorated with oblique lines of dentate stamp impressions.

The Mississippi Pattern

Manifestations of the Mississippi pattern in Minnesota are confined to the southern part of the state. They fall into 2 major divisions, one of which is the Great Oasis focus, while the second includes the Cambria, Silvernale, Blue Earth, and Orr foci. The latter division is believed to constitute a sequence not only in time but also in developmental stages.

The pattern as a whole is primarily distinguished from the contemporary Woodland cultures in having developed agriculture, as evidenced by the presence of storage pits, scapula hoes, and larger villages, and in its pottery types, in which handles are present and in which the method of decoration is largely confined to incised or trailed lines supplemented by punctates.

Much remains to be learned about each of the foci before a truly comprehensive report can be made on them, for at present the Orr focus is known mainly from burial sites, the other foci from village sites only. But the foci of this pattern are much more sharply defined than are those of the Woodland cultures, and distinctions between them can be made with more confidence. Traits of the Great Oasis, Cambria, and Blue Earth foci have already been described in some detail (Wilford 1945b), much of which need not be repeated.

The Great Oasis Focus. The Great Oasis focus is distinguished primarily on the basis of its pottery. Briefly, the typical vessel is globular with a short neck, which meets the body at a sharp angle, and with no handles. The body is marked with the cord-wrapped paddle, and the neck exterior is filled with closely spaced, horizontal, incised lines, across which are drawn oblique lines to form a zigzag meander resulting in lozenges and triangles. In some vessels the bodies have horizontal incised lines extending downward from the base of the neck for an unknown distance, but apparently not to the base.

Arrowheads are stemmed, triangular with or without side notches, and triangular with corner notches. True bison scapula hoes have not been found, but sickle shaped objects are found in which the scapula is so cut as to leave the spine, with the entire distal end projecting from it as a spur. The proximal end is cut off so as to leave a sharp point. It is possible that these were used as digging sticks.

In addition to the type site at Great Oasis Lake in Murray County, a fairly extensive but less rich site on a mesa-like formation in a swamp, also in Murray County, has been tested. A small site at Lake Benton in Lincoln County is known. John Champe has recovered a small, complete, typical Great Oasis vessel from a site in eastern Nebraska.

Cambria sherds are found in the 2 upper levels at Great Oasis, indicating contemporaneity of the 2 cultures in all but the earliest periods at that site. Some Oneota sherds were found in the top level, and are believed to have been later than the Great Oasis occupation. Great Oasis sherds are found in Mill Creek sites, and the style of neck decoration is found in South Dakota sites. Hurt's rim design types I to IV (but not II B) from the Swanson site in South Dakota have characteristic Great Oasis decorations, though the rim form is not similar (Hurt 1951: 90). Hurt lists 20 sites resembling the Swanson site and includes Great Oasis. In recognition of the western orientation of the culture, the Great Oasis focus is placed in the Plains phase, aspect unnamed, of the Mississippi pattern.

The Cambria Focus. Cambria and Great Oasis pottery is grit tempered, whereas Silvernale, Orr, and Blue Earth wares are shell tempered. Cambria vessels have rounded bases, definite shoulders, which may be rounded or sharply angular, and often have paired handles, which are usually loop handles. Rim differences divide them into 3 types, of which the predominant type has been designated Cambria A, and the minor types Cambria B and Cambria C. There are differences in the decorative

technics which are correlated with the rim forms.

Cambria A pots have straight rims, either vertical or outward flaring. Only 8% of the rims have any decoration other than punctates or depressions at the edge of the lip. The decorated area is the upper body, and the design is made with drawn lines, that may be fringed with punctates or elongate depressions. The trailed or incised lines are rectilinear and there are 2 common designs. In the first, a band of parallel horizontal lines extends downward from the base of the neck part of the way or all of the way to the shoulder, and at the base of the band there is usually a simple, zigzag meander and/or a row of elongated depressions placed vertically or obliquely. The second common design is the chevron. There are usually horizontal lines between the chevrons, and sometimes horizontal or oblique hatched lines within the chevrons.

In type B vessels the line from the rim to the base of the neck is distinctly concave on the interior and convex on the exterior forming an S-curve. In some the curve is strengthened by external thickening above the base of the neck, to give the effect of a collar, or by internal thickening at the base of the neck. The common design on the upper body is the chevron, which may be of trailed lines or of single cord impressions. Nearly half of the necks are decorated, and neck decorations are more commonly of single cord impressions than of drawn lines. The principal neck design is a pseudo-chevron, where only the inner lines meet, on a background of horizontal parallel lines.

Type C vessels have no necks, but the upper body terminates at the mouth in a rolled rim. Handles and sharply angular shoulders are apparently more common in this type than in the other types. Cord-wrapped paddle markings on the surface below the shoulder, not uncommon in types A and B, are rare in type C. The type is further distinguished by the almost exclusive use of broad trailed lines for decoration, and by the frequent use of curved lines, particularly in simple and interlocking scrolls.

Arrowheads are predominantly triangular, though triangular points with side notches are common. Triangular points with both side and basal notches are rare. Interesting is the large number of arrowshaft polishers of ferruginous red sandstone.

Both the type site near Cambria on the Minnesota River in Blue Earth County and a small site near it are situated in locations admirably suited for defense. There is no evidence of fortification and definitely no pyramidal mounds. At a third site on the Minnesota River, the Gillingham site near Granite Falls, about 70 miles upstream from the Cambria site, there was a semicircular ditch with the river bluff at the open end. The pottery varies in several respects from the type site, for Cambria C sherds are absent, and the Cambria B type comprises 30.6% of all rim sherds, in contrast to 3.5% at Cambria. Cord-wrapped paddling is much more frequent, also.

The range of Cambria sites is little known. Typical sherds are found in the alluvial banks of the Minnesota River where it flows out of Lac Qui Parle Lake, 27 miles upriver from the Gillingham site, and 32 miles below the source of the river at Big Stone Lake. At Big Stone Lake some of the mounds contain primary burials. A few Cambria sherds were found in one of these and another contained a small mortuary pot of Cambria type with loop handles.

The Cambria focus is no longer placed in the Middle Mississippi phase as so many of the diagnostic traits of that phase are not represented. But the type A pottery is without question much closer to Middle Mississippi than to Woodland, and Cambria type C shows striking parallels, except in temper, to Aztalan pottery and to the Powell Plain and Ramey Incised types of the Old Village focus (Wray 1950: 159).

The Silvernale Focus. The type site of the Silvernale focus is a habitation site on the south bank of the Cannon River at its junction with the Mississippi River, 4 miles west of the center of the city of Red Wing. On 2 terraces immediately south of the village site Theodore Lewis, in 1885, surveyed 317 mounds and estimated that there were 50 to 75 additional mounds not surveyed (Winchell 1911: 154, 156). On the higher terrace, which extends westward along the Cannon River, there was a group of 173 mounds at the Bryan farm, 2 miles from the Silvernale site. Immediately east of the Bryan mounds is a gravel pit in which stripping operations have disclosed the presence of a habitation site with storage pits,

in some of which burials had been made. The pottery of the 2 village sites as well as the mortuary pottery accompanying the storage pit burials is characteristic of the Silvernale focus.

Silvernale pottery differs from Cambria pottery in 3 important traits — it is shell tempered, the most common shape has a rolled rim and no neck, and the designs on the upper body are often curvilinear rather than rectilinear. It is predominantly Cambrian type C pottery, with a substitution of shell tempering for grit tempering. At the Silvernale site the shell has been leached out, except for a few sherds from the lower levels. The common designs on the upper bodies are spirals or scrolls and chevrons. Vessel walls are thin and the trailed line decorations are so deeply impressed as to characteristically exhibit the decoration in relief on the inside. Handles are of the loop variety and are infrequent.

At the Silvernale site 20% of the sherds are grit tempered, some of which are clearly Woodland, and others are definitely of the Cambria type. There is a probability of error in attempting to attribute undecorated body sherds to one type or the other, but they have been identified as about 5% Woodland and 15% Cambria. No significant stratigraphical differences were shown in the distribution of the 3 pottery types, from which a probable contemporaneity may be inferred.

A large mound and a small mound were excavated at the Silvernale site, but both proved to be essentially sterile and there were no cultural materials to connect the mounds to the site. Burials at the Bryan site were primary with bodies flexed to fit the abandoned storage pits in which they had been placed. Typical Silvernale pottery accompanied the burials. The bones were in good condition in contrast to the few bone fragments found in the Silvernale mounds, so it is very improbable that the latter were constructed by people of the Silvernale culture.

Arrowheads at the Silvernale site were predominantly triangular or triangular with side notches, though one point was stemmed. A broken bison scapula hoe and some arrowshaft polishers of ferruginous red sandstone were present.

The Silvernale pottery is clearly related to Aztalan, to Apple River, and to the Monks Mound aspect. Its relations to Cambria are much less evident. Grit-tempered pottery is older than shell-tempered pottery in the area and Cambria was at first believed to have antedated Silvernale for that reason. But the stratigraphy at the Silvernale site suggests at least a partial contemporaneity of the 2 cultures. The closest parallel in the pottery is that between the grit-tempered Cambria type C, a minor type at Cambria, and the Silvernale type. But it is this very type that is Cambria's closest link to Monks Mound. It is possible that Cambria's connection with Monks Mound is an indirect relationship through Silvernale, but Cambria type A ware with its angular shoulders and trailed line decoration may well have been the first pottery of a general Mississippi pattern type in southeastern and south central Minnesota, followed by Silvernale with more specifically Monks Mound traits.

A geographical feature, the unusual course of the Minnesota River, may have played an important role in the relations between the cultures. The Minnesota River flows southeast from Big Stone Lake to Mankato, then turns abruptly to flow northeast, emptying into the Mississippi River at the Twin Cities. The Cambria site is about 15 miles up the Minnesota River from Mankato. Mankato is 25 miles farther south than Red Wing, and the shortest good route from the Mississippi River to the upper Minnesota River is the valley of the Cannon River. The Silvernale and Cambria sites are not as far apart as they would seem to one thinking in terms of an all-water route via the Twin Cities. This geographical factor may also have a bearing on the distribution of the sites of the Blue Earth focus.

The Blue Earth Focus. The largest concentration of Blue Earth sites is near Winnebago, about 30 miles up the Blue Earth River (south) from Mankato, and thus in the general vicinity of the Cambria site. Another site is at the southern tip of historically noted Prairie Island in the Mississippi River. This is the Bartron site, which in a direct line is only 2½ miles distant from the Silvernale site. The most northern site now known is a small village site on the St. Croix River near Marine, north of Stillwater.

Blue Earth pottery is typical Oneota pottery with shell temper, rounded shoulders, short necks that are usually flaring, and very wide strap handles, except at the Bartron site, where loop handles of the Silvernale-Cambria type predominate. The principal decoration is on

the upper body and is made with trailed rectilinear lines. The characteristic design is one in which the upper body is divided into panels by vertical bands of parallel lines, and the panels are spanned by chevrons which point up and down respectively in alternate panels. Chevrons are commonly bordered by a row of punctates or elongated punctates, or by a fringe of short vertical lines. The entire panel below the chevron may be filled with vertical lines particularly if the chevron is an upward pointing one. Occasionally concentric circles are found below handles, the only form of curved lines found.

Arrowheads are almost invariably of the small triangular type without notches. End scrapers are notable for their uniformity of shape and because the best chert at the sites seems to have been reserved for their manufacture. Storage pits and bison scapula hoes are common, arrowshaft polishers of ferruginous sandstone are present, and an occasional large knife of excellent workmanship is found. Objects of catlinite are rare.

The Blue Earth focus can confidently be assigned to a later period than Cambria or Silvernale. At the Bartron site the shell tempering in the sherds is present in excellent condition, whereas at the nearby Silvernale site it has disappeared from all but a few sherds. The culture of the Oneota aspect, to which Blue Earth belongs, continues into the historic period, though contact materials are not found in sites of the Blue Earth focus. Silvernale and Cambria are both precontact.

The Upper Mississippi phase has generally been regarded as due to a fusion of Middle Mississippi elements with older Woodland elements in a broad belt extending from Minnesota and Iowa through Wisconsin, Northern Illinois, and Ohio into New York. From a purely local point of view, Blue Earth can reasonably be viewed as a development from the Silvernale culture, with no noteworthy features that can be attributed to the Woodland pattern. Blue Earth villages are found in the same general areas as those of their predecessors. Cultural changes are relatively minor. A decrease in the ratio of notched to unnotched triangular points, elimination of angular shoulders and rolled rims in jar forms, substitution of strap handles for loop handles, less polishing of vessel surfaces, and a loss of curvilinear lines in pot decoration are the more obvious modifications. Some of these changes suggest a decadence in the ceramic arts, which seems to continue into the final stage of the Oneota aspect in Minnesota, represented by the culture of the Orr focus.

The Orr Focus. This is badly represented in Minnesota because of lack of a worthwhile village site. Knowledge of the culture is confined to the traits manifested in burial sites in the Root River valley in the southeastern corner of the state. Such sites fall into 2 categories — burial mounds, and what may be called cemeteries. Mounds are not plentiful. The known mounds are all on top of the high bluffs overlooking the river. The cemeteries are in the valley, on spurs or ridges projecting from the base of the bluff onto the valley floor. Slab rock is used in both types of sites. In mound burials the bodies are placed in graves, and often covered with rock to the top of the pit. A low mound of earth is placed over the pit or pits, and a veneer of slabs laid on the mound. Cemetery burials often have slabs on edge beside the body, or laid flat on the body, or both. Burials are characteristically on the back, fully extended, and are often accompanied by grave goods, particularly ornaments and small mortuary vessels.

The pottery is known from mortuary vessels, which is probably not representative of the full ceramic range. Some vessels are as small as a teacup and the largest is only 21 cm. long and 14 cm. high. The elliptical shape is the more common, and such vessels usually have a handle at each end. Round vessels may have 4 handles. Handles are of the narrow strap variety, not as wide as those of Blue Earth vessels, and meet the neck below the rim more often than at the rim, which is the reverse of Blue Earth. The decoration of the upper bodies is less ornate than Blue Earth. Trailed lines are not as wide and deep; the chevron is not common; and some decorations are confined to simple vertical or oblique lines running down from the base of the neck. Punctates are often used as area fillers, rather than as line fringes. Such areas are often found below the handles. Festoons may be used from handle to handle on the vessels with 4 handles.

Arrowheads are all of the simple triangular type, and end scrapers are numerous, though less uniform in shape than at the Blue Earth villages. Catlinite is much more important, and the projecting stem pipe with disc bowl

is considered diagnostic of Orr. But some disc pipes lack the projecting stem and some projecting stem pipes lack the disc. One of the latter has grooves in the projecting stem to simulate a bird's beak. A small raised eyelet above the opening of the stem is found on 2 specimens. Copper ornaments are common and commonly in the form of tubular or spherical beads, conical tinklers, and helical coils of fine wire. The wire is made of thin, flat strips of the metal, tightly rolled up. The most informative ornaments at the Hogback site at Yucatan, the largest cemetery yet excavated, were a number of glass beads. From historical sources it is known that French traders were in contact with the Iowas in this area in the last half of the 17th century, and that the Iowas abandoned the area shortly before A.D. 1700. The Orr-focus culture is almost certainly that of the Iowas, and it may be inferred that the Blue Earth culture was theirs, too. Can this be extended backward to include the Silvernale culture, or the Cambria?

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UNIVERSITY OF MINNESOTA
Minneapolis, Minn.
June, 1954
Revised Jan., 1955

CREEK AND CHEROKEE CULTURE IN THE 18TH CENTURY

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EXCAVATIONS, not yet reported in detail, at sites adequately documented as having been occupied during the 18th century make it possible to outline Creek and Cherokee cultures of this period. A comparison of the outlines indicates similarities and differences which may be of some importance in the archaeology of the area in which the Cherokee and various "Creek" groups were the dominant cultures in the contact and early historic periods, namely, Georgia, Alabama, Tennessee, and North and South Carolina.

CREEK

Excavations at the Kasita site near Columbus, Georgia, leading peace town of the Creek confederacy, were carried out by Gordon R. Willey. Available documentation indicates continuous occupation from approximately 1715 to 1836 and the removal of the Creeks to Oklahoma. The artifact complex representative of the culture in this period, probably the earlier portion of the period in view of the relative scarcity of trade material, indicates the following:

Pottery. Chattahoochee Brushed (Bullen 1950: 103), Ocmulgee Fields Incised (Haag 1939), Kasita Red Filmed (Haag 1940). Of the unnamed plain types, the commonest, nearly half of the collection, is a plain ware with the smooth surface of Kasita Red Filmed; the commonest shapes seem to be bowls.

Pipes. The only aboriginal object found in addition to pottery was a single stone pipe. The bowl was barrel shaped, attached to a square stem at a slight angle.

Trade Material. Bells, including "hawk" bells of brass; kaolin trade pipes; iron objects including gun parts, clasp knives, chisels, files, and adzes; glass fragments from bottles; and beads were found, apparently all of English origin. One bead type, found in several sizes of round and oval shapes ranging from ⅛ to ¼ inch in diameter, may be of particular importance. It has a core of dark green glass and an overlay of nearly opaque tomato-colored glass. John Witthoft (personal communication) notes that such beads appear to be restricted to the lower Southeast. They have been found at Tugalo (see below) and in early 18th century Siouan sites in North Carolina. Estimated dates for the trade objects fall entirely within the 18th century.

Structures. None excavated. Available descriptions, such as that by Hodgson in 1820 (Swanton 1946: 633) are of late-period log structures. In this period they were sometimes raised on piles. A feature of the village was a council house, circular in floor plan with concentric rows of posts to support the roof. A square ground with 4 sheds was adjacent to the council house. There is, of course, little doubt that earlier houses were wattle and daub.

Related Material. A rather similar ceramic complex, ascribed to the late 17th and early 18th century Hitchiti, is known from Ocmulgee Fields. The major difference between the Ocmulgee Fields complex and that at Kasita seems to be in replacement of the grit-tempered Chattahoochee Brushed by the shell-tempered Walnut Roughened (Haag 1940). This latter type also seems to employ more roughening technics than the uniformly simple brushing technic of the Chattahoochee type.

Many sites, usually small, with the same general ceramic complex as Kasita, are known (Fairbanks 1952: 299; Bullen 1950; University of Georgia collections), although the proportions of the 3 major types vary considerably. It is not yet determinable whether these variations represent cultural differentiation in time or space. The related sites are found on the Chattahoochee and in the upper Oconee-Ocmulgee drainage, the Creek center from 1690 to 1715. Related pottery was made by the various Creek-derived Seminole groups (Goggin 1949: 37) and by the Creeks after their removal to Oklahoma (Quimby and Spoehr 1950: 49-51; Schmitt 1950: 3-8; Proctor 1953: 43-53).

CHEROKEE

Excavations were undertaken at the town of Tugalo near Toccoa, Georgia, by the Department of Anthropology of the University of Georgia for the Tsali Institute for Cherokee Research in 1952. Field work was supervised by W. Edwards. Collections are stored at the university. There is adequate documentation for the fact that the site was one of the larger and more important of the Underhill Cherokee towns in 1719 and 1725. Adair indicates that it was an old ruined town in the 1760's, although there is some evidence for occupation as late as 1800. Since the excavated materials seem perfectly uniform, with no evidence for a fully precontact occupation of the site, these

dates give us fair limits. The complex includes the following:

Pottery. Tugalo Complicated Stamped (to be defined); differs from Overhill Complicated Stamped (Lewis and Kneberg 1946: 105) mostly in the use of grit rather than shell temper. The dominant vessel form is a large jar. Rims are notched or pinched at base of fold, lip edge, or on band. Stamping is heavy, poorly executed, and heavily overstamped. Motifs are predominantly angular, although a strong element of curvilinear motifs is present.

Boyd Check Stamped (Caldwell 1955: 279).

Tugalo Simple Stamped (to be defined); like complicated stamped except for decoration, a simple stamp applied with grooved paddle. Many small sherds which must be so classified could come from elongated angular motifs in complicated stamping.

Tugalo Incised (to be defined); the incision of this type might be characterized as stylistically intermediate between Lamar Bold Incised (Haag 1939) and Ocmulgee Fields Incised (Haag 1939). Clear, neat incision is normal, usually on the upper portion of cazuela bowls, with the incised area on the upper part of the vessel set off from the stamped or otherwise roughened lower portion by notches or punctations in many cases. Simple interlocking frets are the commonest designs, and line-filled triangles are also of some importance.

Pipes. Both pottery and stone specimens are present, very well made in either case. Stone forms tend to be small with a cylindrical or barrel-shaped bowl set either vertically or at a slight angle to the stem. Ceramic pipes are usually made with barrel- or trumpet-shaped bowls and thickened stem ends. Decoration consists predominantly of circular, square, or diamond-shaped areas set off by appliquéing the elements or by deep, careful cross-hatched incision. Loops at the upper and outer end of the trumpet-shaped bowls are common, and basal fragments from monolithic ax pipes are relatively frequent.

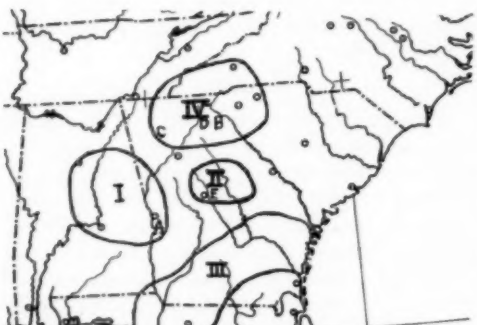

FIG. 39. Creek and Cherokee Locations. I, Major Upper Creek area; II, Creeks, 1686 to 1715; III, Lower Creeks and linguistic relatives, Apalachee, Apalachicola, Yamassee, and others; IV, Cherokee. A, Kasita; B, Tugalo; C, Etowah; D, Nacoochee; E, Macon.

Trade Material is rather common. Trade pipes are frequently found, as are fragments of bottle glass. Iron objects are varied, with gun parts perhaps the largest single category. Musket balls run in the .60-.70 caliber range. A great many beads were found and were subsequently submitted to John Witthoft for comment. Generally speaking (personal communication) the types present are commonest in the north in the early part of the 18th century. One of the commonest types is that described above for Kasita, green glass overlaid by tomato-colored glass.

Houses. Evidence for house types is rather scarce, although Edwards has some unpublished data. There is an early Cherokee structure from Etowah which will be described further on. Rectangular wattle and daub structures were certainly used early, and were replaced by log construction in the 18th century. Cherokee council houses according to several descriptions (Swanton 1946: 402-3) had approximately the same floor plan as those of the Creeks, roughly circular with one or more inner rings of posts for roof supports. Square grounds adjacent to the council house appear to have been present in at least some villages.

Related Material. The same or closely related ceramic complexes characterize many other sites. These include Oconee in Tennessee (Kneberg 1952); Fort Loudon in Tennessee with dates of 1760 and 1761 (Lewis and Kneberg 1946: 98); western North Carolina sites in the vicinity of the modern Cherokee Reservation; and many sites both with and without trade material in the sections of South Carolina and Georgia adjacent to Tugalo (Caldwell 1955: 279), many of them sites which can be readily documented. This is also the assemblage characteristic of the later occupation at Peachtree (Setzler and Jennings 1941) and, with very little check stamp in the assemblage, of the Nacoochee site. Earlier occupations are present at both of these sites. This Cherokee ceramic assemblage in several variations is also present in the Etowah Valley, where, with the incised ware missing, it has been ascribed to the Galt period and historic Cherokee by Caldwell (1950: 7-9). I might suggest, from the few sherds illustrated, that the Brewster-period pottery is also Cherokee. Too, there is now little, if any, doubt that the "Lamar" occupation at Etowah is early Cherokee. Following accepted practice, I have classified the check-stamped pottery from Tugalo as Boyd Check Stamped (Caldwell 1955: 279) since it fits this type description. I have had the opportunity of inspecting the 6 vessels on which this type description is based, as well as the Galt period specimens. There are minor differences, probably due to the very small size of the collections. Discounting these, there is no doubt that all of the historic Cherokee check-stamped pottery excepting the shell-tempered Overhill Check Stamped falls in a single type as the type concept is applied in

the Southeast. This is also true of the associated complicated-stamped pottery from the various sites and assemblages, with the possible exception of some of the Etowah specimens.

In the interest of terminological economy, it is strongly suggested that collections which may be related to, or part of, this historic Cherokee complex, be checked against the available collections, at least until such time as study and publication of the large Tugalo and Hartwell reservoir assemblages is undertaken.

It is worth noting that this distinctive ceramic assemblage, documented as characteristic of the Cherokee from at least 1700 to nearly 1800, occurs only in the known Cherokee area. Just as importantly, there are no other assemblages in this area which can be shown to have extended up into the historic period.

John Witthoft, in his paper on green corn ceremonialism (1949: 83) notes many ceremonial elements which are shared by the Creek and the Cherokee, generally indicating that in ceremonialism the Cherokee are definitely Southeastern. These traits include, out of a long list of Busk-Cherokee ceremonial resemblances, the open square ground surrounded by sheds, use of an emetic followed by herb medicines, use of herb medicines as prophylaxis during the ritual, injunction against the eating of corn prior to the ceremony, the green corn festival as the new year rite, the square ground consecrated, swept, or covered with fresh earth and restricted, and the "going to water" ritual. Generally speaking, the differences between the Creek and Cherokee ceramic assemblages seem at least as great as, perhaps greater than, other cultural differences which may be perceived in the available records.

COMPARISONS

We may then, with this much of the 2 culture patterns outlined, see how far we can go with tracing origins. Evidence applicable to the problem is of 2 sorts, legendary and archaeological. According to the various legends, the Creeks came into Georgia at an early time from the north and west, with the Hitchiti arriving before the Muskhogee. The major use of this legend in interpretation of archaeological phenomena has been at Macon Plateau (Fairbanks 1952: 290, 294, 300). Fairbanks has suggested that the Timucua or Yuchi might be representative of the culture which developed the earlier complicated-stamped ceramics as their basic ceramic tradition. The Cherokee are believed, following an assortment of statements and legends, to have entered the lower Southeast quite late. In northern Georgia and the Etowah Valley region specifically, the replacement is believed to have taken place after a battle at Ball Ground on the Etowah River in 1755 (Mooney 1900: 384-5).

The picture on legendary grounds then is one of early occupation of the South Appalachian province by some unknown culture, ceramically characterized from Middle Woodland times on by complicated stamping as the major pottery decorative technic, and replaced in considerable part by the Creeks who held most of the area by 1700. Then we have another intrusive population, the Cherokee, coming down out of the mountains after 1700 and replacing the Creeks throughout much of the northeastern portion of Georgia.

This interpretation of legends seems reasonable enough until we line it up alongside archaeological fact in the form of documented historic period assemblages and known historic site locations. Known locations for the Creeks in Georgia, excluding the various units of Hitchiti-speaking "Lower" Creeks, such as the Apalachicola, Apalachee, and Yamassee, include only the Chattahoochee River towns from 1600 or earlier to 1686. Then they moved to the upper Oconee-Ocmulgee drainage to be nearer the English traders for about 30 years, from 1686 to about 1715, returning to the Chattahoochee area at the outbreak of the Yamassee wars. The Cherokee locations were in the upper Savannah River drainage and the Etowah, Hiwassee, and Eastern Tennessee river drainages through the entire 18th century, going back to 1700 at least. Due to lack of white penetration of this area until after 1750 there are few earlier records.

Perhaps the most important single point in this attempt to understand the origins of these 2 cultures is that Cherokee pottery is Lamar-style pottery. The stamped ware is rather close to Lamar Complicated Stamped and its various undescribed protohistoric relatives. Incised Cherokee pottery, as noted, overlaps with Lamar Bold Incised and Ocmulgee Fields Incised, but is generally rather closer to the fully precontact type. The check stamped, of some importance in the Cherokee assemblages, is not

present at the Lamar type site, and so is not usually considered as a part of "Lamar" assemblages. A check stamped very similar to Boyd Check Stamped is, however, quite important in sites with Lamar-style complicated stamped and an off-brand of incised ware which is rather similar to Fort Walton Incised (Willey 1949: 460-2) in the southern part of Georgia. Included here are the Lamar component at Kolomoki with Mercier Check Stamped (Sears 1951: 31) and the Bull Creek site in Columbus, Georgia.

Creek pottery on the other hand, considered without preconceptions, is certainly not Lamar-style pottery, although a degree of relationship, not necessarily genetic, is clear. The over-all brushing technic for jars is uniquely Creek, although with definite relationships into such late Mississippi Valley cultural units as Plaquemine. The "Lamar" rim treatment styles are more characteristic of the general protohistoric and early historic horizons than of any single complex or culture. It would appear to me that this feature assumes importance as a cultural indicator only when associated with another decorative treatment such as complicated stamping. Unless so associated, as one of the features of a ceramic "type," it is a horizon rather than a cultural marker. In any event, the known Creek pottery uses one specific variant, a pinched appliqué band below the lip, to the near exclusion of other treatments. This seems to hold for Chattahoochee Brushed, Walnut Roughened, and the historic-period pottery of the Upper Creeks in Alabama (Lewis H. Larson, Jr., personal communication). The larger assortment of notched, pinched, and fingernail marked bands, folds, strips, and rim edges which appear in a number of the protohistoric Lamar style assemblages is duplicated at the contact level only in Cherokee pottery.

It may be worth emphasizing that there are a number of distinct pottery types in the "Lamar" style. Some of them, such as Lamar Complicated Stamped and Lamar Bold Incised have been formally described. There are also many other assemblages, units from specific sites, which contain pottery related to the described Lamar types at the general style level, but are nevertheless different in many details. Tugalo Complicated Stamped and Tugalo Incised are only 2 of these. If broadly enough defined, such style elements as grit temper, heavy overstamping, simple incising in interlocking scrolls and guilloches, and notched, pinched, or luted rim treatments are useful horizon markers. However, to simply classify an assortment of sherds into Lamar Complicated Stamped and Lamar Incised as is often done, because they fit the style, when they differ specifically from the described types, accomplishes little, if anything. It certainly does not provide data for synthesis. Actually, if for some reason it does not seem desirable or possible to fully analyze and describe a collection, and publish the results, it might be better to state that it contained protohistoric pottery of the South Appalachian province. This would at least be less confusing, and would not imply that analysis had been performed.

These differences from and similarities to assemblages with Lamar-style pottery known to be fully prehistoric assume some importance when we realize that complicated-stamped Lamar-style pottery is the end product of the complicated-stamped tradition, the tradition which is the hallmark of the South Appalachian province from the beginning of the Middle Woodland period (Sears 1952).

Direct interpretation of the archaeological evidence would then lead to the conclusion that the Cherokee ceramic assemblage is a development in this indigenous tradition, and that Cherokee culture is then indigenous. Creek culture on the other hand might well be viewed as intrusive, or at least that of the upper, Muskhogee-speaking Creeks, and such culturally close relatives as the Hitchiti, Oconee, and Ocmulgee, who made the brushed pottery from at least 1690 on, with only a variant of a widespread style of rim decoration and an extreme variant of an almost equally widespread incised style to link it to the South Appalachian tradition.

There are a number of other facts which support this interpretation. First, the ceramic sequence in the northern portion of Georgia, above the fall line, seems to indicate that Cherokee stamped pottery finds some of its roots in the tradition of angular complicated stamping which developed in that area (Sears 1952). Most specifically, the relationships are to Etowah Complicated Stamped which appears dominant at the Southern Cult level. This is followed by the apparently intrusive Wilbanks Complicated Stamped (Sears 1955) which employs stamping in the curvilinear tradition and a rather distinctive assortment

of paste characteristics, vessel forms, and appendages. We find, in the stamped Cherokee pottery, design elements derived from both the Etowah tradition and the intrusive Wilbanks style although resurgent Etowah influence on the Wilbanks pottery is clear, just before its final development into Cherokee. A point which may be emphasized here is that the angular motifs characteristic of Cherokee complicated stamping appear only in north Georgia, whether pre- or postcontact, while the stamping with curvilinear motifs is found predominantly in the southern part of the state (Sears 1952), chiefly before the intrusion noted.

Check stamping appears to be a late addition to the Cherokee ceramic complex, and may in part have replaced complicated stamping by about 1800 (Caldwell 1955: 279). A house excavated at the Etowah site, with a floor plan conforming to Creek and Cherokee council house standards, produced over 4000 sherds. Decorated pottery consists almost entirely of Tugalo Complicated Stamped and Tugalo Simple Stamped, plus a great deal of incised pottery. Most of the latter could be classified as Tugalo Incised, but there are sherds which singly would have to be classified as Lamar Bold Incised and others as Ocmulgee Fields Incised. There are, however, no check-stamped sherds present at all. The house was occupied in the contact period, although it must have been early, as indicated by 1 trade pipe fragment, 1 musket ball, a few small glass and brass scraps, and bones and teeth from a horse. Contemporaneity with historic Creek culture of the Kasita variant was indicated by several Chattahoochee Brushed and Kasita Red Filmed sherds.

As far as can be determined, this assemblage is nearly identical to that from Nacoochee (Heye, Hodge, and Pepper, 1918), excluding of course the Etowah and Wilbanks series sherds from that site, which apparently duplicated cultural developments at Etowah. The identity runs to exact duplication of the more frequent designs in stamped and incised pottery, to pipe types, and to lack of the check stamping as a part of the complex. In both sites, the occupation seems to end so early that exact documentation will be difficult. My own guess is that the differences between the Etowah-Nacoochee assemblage and that from immediately post-1700 Tugalo indicate a date back to 1650 for the Etowah and Nacoochee towns. In this period, the Cherokee were in contact with traders working out of Virginia with pack trains, so that identification of these towns, and others which will undoubtedly turn up, must be made from the other side of the mountains if at all.

With this Etowah to Wilbanks to pre-1700 Cherokee to post-1700 Cherokee series of ceramic assemblages, limited in its occurrence in space to the known Underhill Cherokee area in Georgia north of the fall line and probably adjacent South Carolina, it is rather difficult to accept the legendary basis for Cherokee origins, which would require that this ceramic complex be developed by some Muskhogean or other culture while the Cherokee took it over lock, stock, and barrel after 1700. As Lewis and Kneberg pointed out some years ago (1946: 99) the obvious source for Cherokee culture is in the South Appalachian province. As they took some pains to point out, the Cherokee ceramic complex is clearly intrusive in the Overhill Cherokee area in which they worked, and could not possibly have developed there from any of the fully prehistoric and protohistoric complexes. I would suggest then that 18th century Cherokee culture developed in the Underhill area and later spread to the north. The various myths and legends may then apply to short term movements of specific villages or bands, not to the Cherokee as a whole.

On the other hand, I fail to see any relationship between Early Mississippian Macon Plateau culture and historic Creek culture, particularly in view of the completely intrusive nature of Macon Plateau culture in the central Georgia area, its limitation to 2 nearly adjacent sites, and our complete lack of any evidence for Macon-derived or even Macon-influenced culture in the long interval between it and the initial appearance of the Lamar styles of stamping, rim treatment, and incision. This interval, characterized to the north by both the Etowah and the succeeding Wilbanks cultures, may well be the one in which the Creek confederacy, and Creek culture as known in the 18th century, developed. But, the interval is there, and no known archaeological complex can fill the gap between Macon Plateau and historic Creek, or even between Macon Plateau and any culture using ceramics in the Lamar style.

There has been no demonstration that any "Lamar" complex developed into any complex characterized by the brushed pottery. It may also be well to make the point that while the Mississippian elements in most of the South Appalachian protohistoric complexes are undoubted, they can scarcely have come from the temporally and spatially extremely limited Macon Plateau culture, separated in time from any known complex with Lamar-style ceramics by some centuries.

In spite of the lack of evidence for Creek origins in the South Appalachian province from either Macon Plateau through "Lamar," or from "Lamar" directly, I do rather doubt that Creek culture and ceramics are completely intrusive, even though this seems to be the case on direct interpretation of the evidence. It seems more than probable that developments in the complicated-stamped tradition resident in the area of the South Appalachian province south of the fall line must have had something to do with Creek origins; and also with the origins of the various Hitchiti or even more linguistically divergent southern groups, such as the Apalachee, whose culture disappeared shortly after 1700 due to intensive mission efforts by the Spanish, Moore's raid, and so on. During the De Soto period, these groups must have been as large as the various Muskhogee-speaking units and could well account for the spread in the area of the various sorts of "Lamar-style" pottery.

However, until we have located the source in space and time of the brushing technic, which now seems to have had its inception in the lower Mississippi Valley, and have shown that it entered a complex in which it replaced complicated stamping, we cannot state that the "Upper," Muskhogee-speaking Creeks are natives of the area in which they appear at the time of the first historic records. Without such a source and evidence for such a development, it is as likely that the inhabitants of Coweta, Kasita, and the Ocmulgee and Oconee, moved in from some such area as that in Alabama known at one point as the "Upper Creek" area with Coosa as its center, as it is that they developed their culture in Georgia.

The point then is that the Creeks may be native to the South Appalachian province. It depends in large part on what sort of "Creek" you are talking about, and the case certainly is not proven. The Cherokee, however, seem certainly to be natives, and cannot be casually dismissed as "prehistoric carpetbaggers."

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Athens, Georgia
August, 1954

CONTRIBUTIONS TO THE ARCHAEOLOGY OF NORTHERN HONSHU

Part II, Ogawara Pit-house Culture

Howard A. MacCord

THIS IS THE second in a series of 3 articles describing recent finds by the writer in northern Honshu, Japan. The first article (American Antiquity, Vol. 21, No. 1, pp. 12-31) was devoted to an introduction to the series and to the description of sites and materials of the Jomon (Neolithic) period. This article is a description of the protohistoric (Haji period) sites found and explored in Kamikita Gun, Aomori Prefecture, Honshu. These sites are primarily those of small villages, in 3 instances fortified by a ditch or an earthen wall. The outstanding characteristic of all these sites is that the old house pits can still be located by the circular, saucer-like depressions showing on the present surface. In addition to the concentrations of house pits which represent villages, many individual house pits may be found scattered about the region. These remains have long been known to Japanese archaeologists and are mentioned by Munro (1908: 73) who states that "Intermediate" pottery is found with them. A total of 11 house pits were excavated by the writer at 4 sites. Every house pit uncovered proved to be square or rectangular with a flat bottom, no trace of a prepared floor, and no indication of an entrance way.

For location on an area map of the sites herein described, the reader is referred to Figure 2 with the first article in this series. U.S. National Museum accession numbers are given in parentheses for artifacts deposited there.

Ogawara Site 3

Ogawara Site 3 is located on the south end of Lake Ogawara, on the north side of the peninsula separating Lake Ogawara from Lake Anenuma and about ½ mile from the point of the peninsula (Anenuma Site 1). The peninsula at this site is about 50 feet above the lake and is fairly level. The bluff edge overlooking rice paddies on the lake shore is dissected by several narrow, steep ravines containing springs. The site lies astride one such ravine and occupies about 2 acres on each side, or approximately 5 acres in all. Surface indications in the form of pit-house depressions (25 or more), sherds, and other artifacts prove the presence of an ancient village. Sherds are pre-

dominantly of the Haji type, though a few of the Sueki and Jomon types are found. The house depressions before excavation vary from 12 to 20 feet in diameter and from 6 to 18 inches in depth. The houses are irregularly scattered and apparently represent a haphazard growth of the village with no planned arrangement. No indication of a protective wall was observed. Figure 40 shows the arrangement of the east half of the village and the numbering of the house pits. Those excavated are shown as squares.

Surface Artifacts. A test square dug adjacent to House 1 showed the normal topsoil to be about 8 inches thick overlying a yellowish clay hardpan. The test square measured 5 by 10 feet, initially, but was later extended into the depression of House 1. The material found in the square, outside the pit house was limited to a few sherds only and has been listed with that material found on the surface of the site. Artifacts found on the surface consisted of 3 flint arrowpoints, 1 clay bead (397079), and a fragment of sponge iron. The clay bead is $\frac{5}{16}$ inch thick and $\frac{7}{16}$ inch in diameter.

House 1

House 1 proved to be roughly square with a flat bottom. The edges of the floor met the vertical side walls in a gentle curve (radius about 6 inches), and the corners, where the walls met, were equally rounded. No sign of an entranceway was found, nor was there any trace of a prepared floor. The only feature found in the house pit was a hearth with an underground chimney centered on the north side of the "room." The hearth was merely a burned area directly in front of the horizontal chimney. The chimney consisted of a vaulted

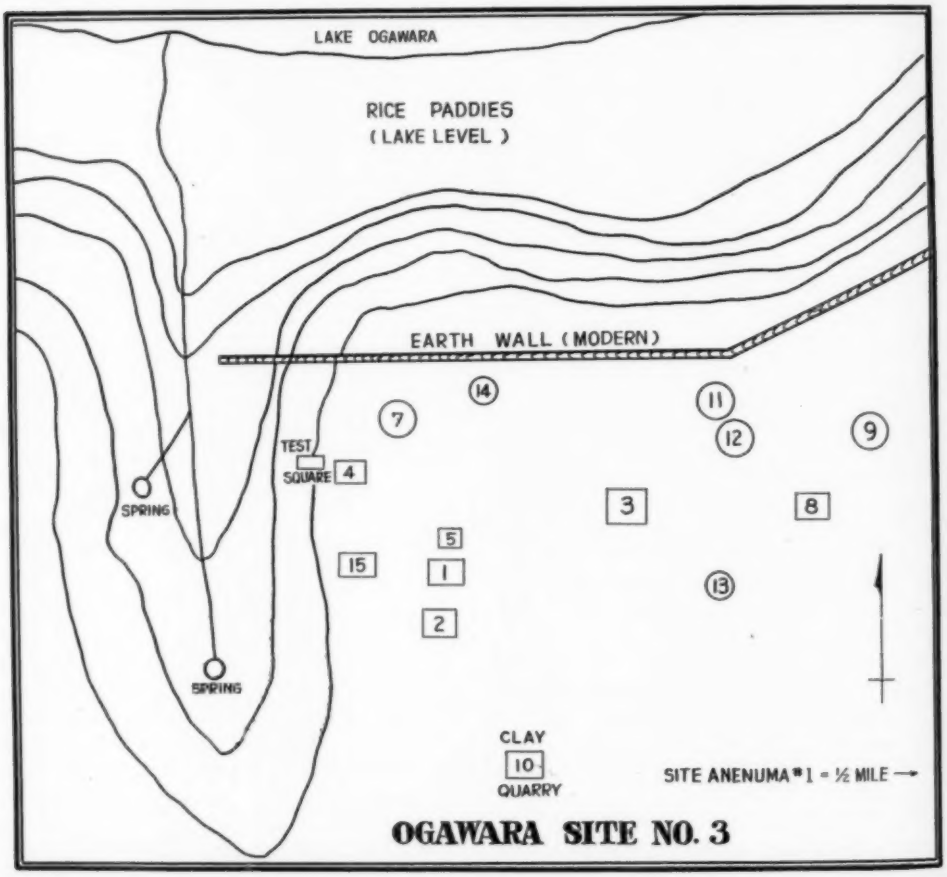

Fig. 40. Plan of east half of Ogawara Site, Northern Honshu. Scale, 1 inch equals approximately 100 feet.

Fig. 41. Vessels from Ogawara Site 3 and Anenuma Site 2 (USNM Neg. 41877-F).

tunnel 12 inches wide and 20 inches high which led northward through the house pit wall to a vertical flue 14 inches in diameter which led to the surface. The interior of the tunnel and the flue were smoke-blackened and showed the marks of having been chopped out of the clay subsoil by means of a pointed digging tool. The tunnel was 5.5 feet long and opened on the hearth at the level of the floor.

Artifacts recovered from the pit fill consisted of 2 nonrestorable pots and many potsherds, as follows:

12 rimsherds representing 12 vessels
20 basal sherds
129 body sherds

Vessel 1 (397037) (Fig. 41, *2*) is a vase with constricted neck and flaring lip. The absence of the base precludes exact measurements of the height and basal diameter. The oral diameter is 7¾ inches. The walls of the vessel are ¼ inch thick, grit tempered, and red, yellow and brown both inside and out. The surface is completely plain with no design whatsoever. The flaring rim is rounded and excurvate in cross section, with 2 marks of unknown meaning incised on the upper surface of the flare (Fig. 42).

Vessel 2 is almost identical in shape, size and color to Vessel 1, except that the exterior surfaces show vertical marks of scraping. Since the base is missing, its height and basal diameter are not known.

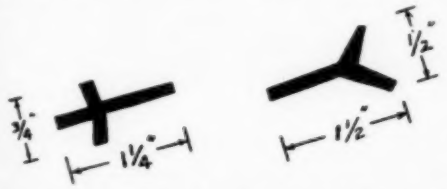

Fig. 42. Marks on Vessel 1, Ogawara Site 3, House 1.

The miscellaneous rims, bases, and body sherds found disclose the following traits: Vessels are vases with constricted necks and flaring rims, or are shallow, flat-bottomed bowls with straight, flaring sides. Basal diameters vary from 3 to 4 inches, and oral diameters range from 6 to 12 inches. Wall thicknesses vary from ⅛ to ½ inch, and all pastes are grit tempered. Bases show a variety of treatment. Some are completely plain, while one base (Fig. 43, *1*) (397123) shows a "pebble-dash" effect resulting from the imbedding of small pebbles in the clay before drying, apparently intentionally, and the remainder show what appears to be a conventionalized leaf skeleton (Fig. 43, 3, *4*). This latter design appears so frequently on sherds of this period, that it may well be considered a diagnostic trait, though it is occasionally found on sherds of the Jomon and Yayoi types. Colors range from red through yellow, buff, brown to black, with interior surfaces of some sherds covered by a black slip which appears to be a form of lacquer. One body sherd shows a faint cord-marked surface, and one rim has striated upper surface, while the remainder of the sherds are completely plain. A few rims show a slight thickening. Rims are mostly rounded and excurvate, though a few are pointed in cross section. No appendages as such are found. Perforations for repair of cracked vessels are found occasionally.

House 2

Pit House 2 was located about 30 feet south of House 1, and was oriented with the corresponding walls parallel to those of House 1. Excavation revealed it to be identical in other respects as well. Features consisted of similar hearths, a group of charred logs, and a subterranean chimney centrally located on the north side of the house. Hearth 1, directly in front of the chimney opening, was a burned area 2 feet in diameter. Hearth 2 was located just west of center of the house. The southwest corner of the room was covered by a layer of

charred logs and thatch, lying approximately 10 inches above the floor of the house and sloping downward from the house corner toward the center of the room. The logs were reduced to mere charred shells and were crushed, while the thatch was in small patches, consisting of thin, hollow, charred sticks of a woody matter which crumbled when touched. Regrettably, no samples were saved. The area of the floor involved was about 4 by 4 feet. This mass of charred material undoubtedly represents the remains of the roof, which fell when the house burned, and was smothered by the earth which, presumably, had covered the roof.

Lying on and to the southeast of Hearth 1 was a cluster of 4 pottery vessels in varying degrees of completeness. Scattered throughout the earth fill of the pit were sherds and 3 other artifacts, a rude stone hammer or pestle (397043); a flint knife or scraper (397042) 2½ inches long and ½ inch wide; and an iron object (397044) resembling a knife, 7 inches long, ¾ inch wide at the widest part, and approximately ⅛ inch thick. One end is incomplete, but seems to have been pointed. The other end is bent into a circular, handle-like, perforated ring with an opening ⅛ inch in diameter.

Ceramic remains include 2 incomplete vessels, 1 restorable cup, and 1 complete vase, besides 9 rim sherds representing 5 vessels, 1 basal sherd, and 25 miscellaneous body sherds.

Vessel 1 (397040) is a vase with constricted neck and flaring lip, made of a grit-tempered, light tan clay. The base is 3½ inches in diameter; other dimensions are undeterminable, due to incompleteness. The walls are ¼ inch thick, undecorated, and show vertical scraping marks. The base shows the characteristic tree leaf design. A small amount of soot-blackening is found on the exterior.

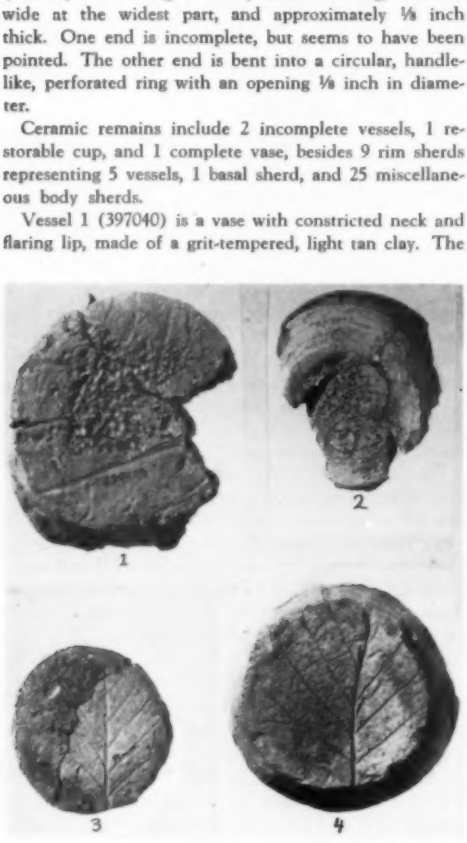

FIG. 43. Bases of vessels: *1, 2,* pebble-dash bases, sherds from Houses 1 and 4 respectively, Ogawara Site 3; *3, 4,* conventionalized leaf designs on bases of Haji type (USNM Neg. 41880).

Vessel 2 (397045) (Fig. 44, *1*) is a vase similar to Vessel 1, but 5 inches high, with an oral opening of 4¼ inches, and a basal diameter of 2⅜ inches. The base is plain, as are the sides. The walls are ¼ inch thick, red and brown on outer surfaces and red, gray, and black on inner. The rim is pointed and flaring in cross section.

Vessel 3 (397041) is a simple cup made of grit-tempered clay, with walls $\frac{3}{16}$ inch thick. The height is 2¾ inches, and diameters are 3¼ inches at rim and 2⅛ inches at base. The base and sides are entirely plain. The rim is rounded and straight in cross section. Exterior is brown and black, inside buff and black.

Vessel 4 (397039) is a complete vase with constricted neck and flaring rim (Fig. 41, *1*). It is 5⅞ inches high and measures 5⅜ inches across the rim, and 3 inches across the base. It is grit tempered, and the walls are ¼ inch thick. The base is plain, and the sides show vertical scraping marks. Exterior colors are red, brown, and black. The rim is pointed and flaring in cross section.

The traits disclosed by the miscellaneous sherds recovered in the fill of the pit are similar to those revealed by the vessels described above. The basal sherd found is 4 inches in diameter, while the largest rim diameter is 7 inches.

HOUSE 3

House Pit 3 was approximately 100 feet northeast of House 1 and was similar in most respects to those already described. This was the largest house pit excavated at this site, and was the only house which showed clear evidence of interior supporting posts for the roof. The house was oriented the same as Houses 1 and 2 and had a similar underground chimney leading from the center of the north side. The square fireplace directly in front of the chimney opening inside the house was more elaborate than those found previously. It consisted of 2 low, parallel walls of clay 4 inches high, 6 inches thick, and 22 inches long centered on the chimney opening. Between the clay walls was a deposit of wood ashes containing 3 incomplete pottery vessels. In the center of the house floor was another hearth, consisting merely of a burned area of the clay floor. Between the 2 hearths was a postmold 1 foot in diameter and 4 inches deep with a rounded bottom. The second postmold, identical to the first, was in line with the first and the hearths and was centered near and 18 inches from the south wall of the house. As in House 2, this house contained a deposit of charred logs in the southwestern corner of the room. The logs were more fragmentary than those of House 2, and no specimen was preserved.

The chimney consisted of 2 horizontal tunnels, one above the other, leading to the vertical shaft. The lower

of the 2 tunnels was 42 inches from the surface and was 14 inches wide and 8 inches high at the highest point of the arched upper surface. The upper tunnel was the same size as the lower, except that it was only 32 inches from the surface. The vertical shaft was 14 inches in diameter while the horizontal tunnels were 5.5 feet long.

The artifacts found in the house fill consisted of 3 incomplete vessels, typical of the Haji ware, from the main hearth, many sherds from the fill, a 3 inch long iron object, shaped like a hand-wrought, square nail (397047), and a few flint chips.

Vessel 1 (397046) is the basal portion of a vase, 3½ inches in diameter. The ware is grit tempered and is ¼ inch thick, red, buff, and gray on the outside and buff on inner surface. The surface is plain, with marks of vertical scraping.

Vessel 2 (397048) is also the lower portion of a vase, with a basal diameter of 4 inches. The base shows the typical leaf design on the bottom. The ware is grit tempered and is brown and gray on outer surfaces and red and yellow on inner. The walls are ⅜ inch thick and are plain, except for vertical scraping marks.

Vessel 3 (397049) is a vase with constricted neck and flaring lips. The over-all height is indeterminate, but the oral diameter is 4¾ inches and the base is 2¾ inches across. The ware is grit tempered, ¼ inch thick, and red and yellow. The rim is rounded and excurvate in cross section. The surface is plain, except for vertical scraping.

The miscellaneous sherds found in the fill of the pit are as follows: 33 rims, representing 24 vessels excluding the 3 described above; 29 basal sherds; and 150 body sherds. These sherds are from vases with constricted necks and flaring rims. The oral diameters range from 5 to 13 inches, and basal diameters from 2½ to 6 inches. Surface finish consists mainly of vertical scraping marks, though in some instances even this is lacking. Rims are rounded and either straight or excurvate, though a few are pointed and flaring in cross section. One example showing an incised groove on the upper surface of the rim is an exceptional case. Two of the rims and 1 each of the body and base sherds show the circular striations attributable to the use of the potter's wheel in the manufacture of the ware. One sherd of the Sue type completes the pottery complex of this house pit.

House 4

House 4 was similar in most respects to those previously described, though in this house at least one previously unrecorded feature was met. No postholes or other structural features were encountered. However, in the southeast quarter of the room was a complex hearth, which had apparently served as a source of heat for the room and for cooking, as well as having been used in the reduction of iron ore to "sponge iron." This hearth (Fig. 45) was 8 feet in over-all length. The dome-shaped part of the hearth was 36 inches in diameter, while the pear-shaped pit in front of the dome was 40 inches at its widest. The floor of the dome and the pit was 4 inches below the floor of the house itself. Inside the dome was a large lump of sponge iron, roughly 20 inches thick and weighing about 20 pounds. The dome consisted of white clay, 4 inches thick at the base and rounded into an arch some 18 inches high, or 14 inches above the level of the surrounding floor. The top of the dome was accidentally sliced away in uncovering the floor of the house. In the pit directly in front of the dome were many pieces of sponge iron and slag, as well as hundreds of fragments of clay tubes (397057). One end of a typical tube is glazed, showing contact with intense heat, while the other end is practically unfired, very friable and tending to become pasty when wet. The tubes vary from 3 to 4½ inches in external

Fig. 44. Vessels from Ogawara Site 3 (USNM Neg. 41878-E).

diameter, while the central hole varies from 1 to 2 inches. The larger tubes are flattened on one side. None of the tubes were in direct contact with the clay dome, so that their precise use in the smelting process is debatable. It is probable that the tubes were inserted in the hearth and used to provide draught for reducing fire inside the dome, possibly with a skin bellows to furnish the necessary compressed air.

Many fragments of sponge iron, slag, and tubes were encountered throughout the fill of the house pit. Sherds found were 26 rims representing 25 vessels, 232 body sherds, and 17 basal sherds, all of the Haji type. In addition 2 rims and 41 body sherds of the Jomon type, probably accidental inclusions, were found at random in the fill.

Also found in House 4 were 1 flint knife (397056), 2 flint arrowpoints (397054-5), and numerous flint chips. Specimens of the iron ore slag and sponge iron (Fig. 46, 3, 4) were preserved, in addition to all larger pieces of clay tubes. The largest intact piece of tube recovered is about 12 inches long, though one other group of fragments when fitted together indicate a segment 18 inches long (Fig. 46, *1, 2, 5*).

Vessel 1 (397051) is a small, oval bowl with a flat bottom. It is 1¼ inches high, and has an oral diameter of 5 by 3½ inches, while the base is 2⅞ inches in diameter. The walls are grit tempered and are ¼ inch thick. The base contains many small angular varicolored pebbles imbedded in the clay before baking (Fig. 43, 2). Colors are red and black outside, while the interior is black lacquer. Surface treatment is plain. The rim is rounded and straight in cross section.

Vessel 2 (397052) is a grit tempered vase with flaring mouth and constricted neck. The oral diameter is 7½ inches, while other dimensions cannot be determined due to the lack of a base. The walls are ¼ inch thick and are red, yellow, and black inside, and yellow, gray, and black outside. The exterior walls are plain, except for vertical striations showing that the pot had been scraped before firing. The rim is rounded and excurvate in cross section.

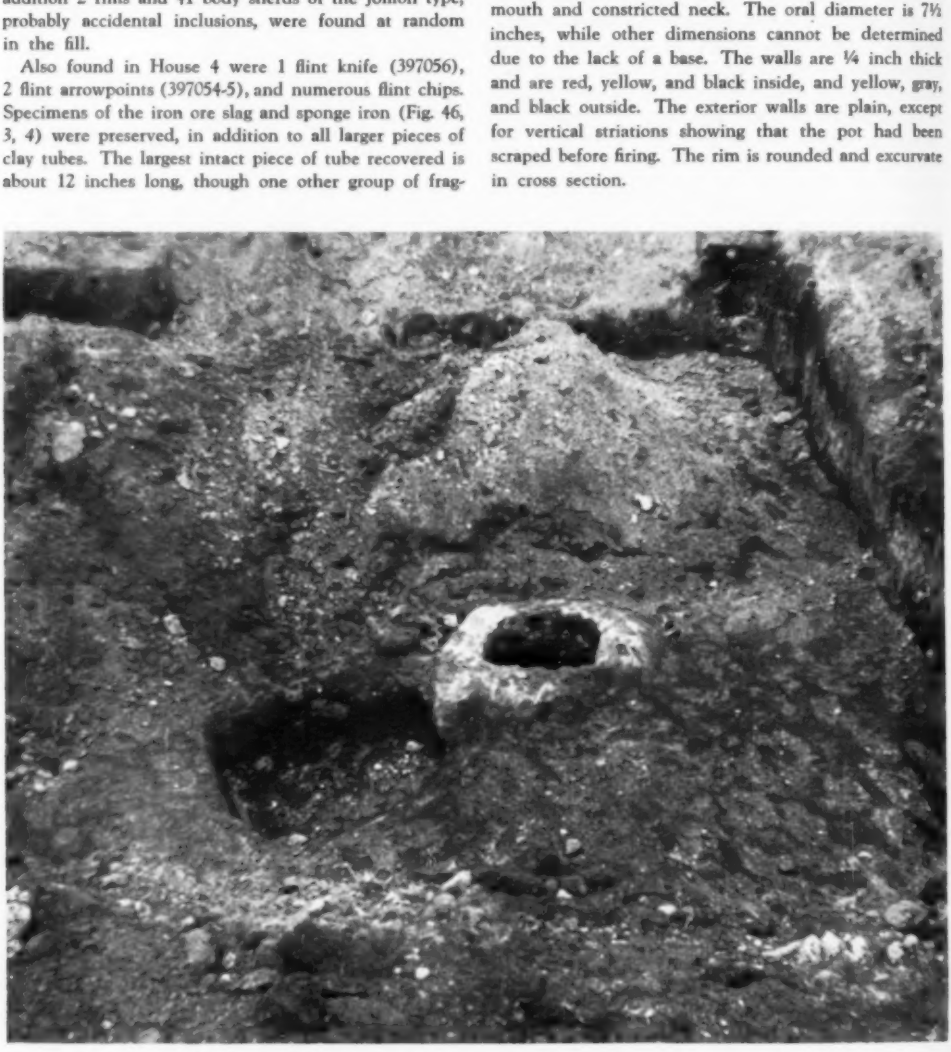

Fig. 45. House 4, Ogawara Site 3, showing hearth possibly used for iron smelting.

The miscellaneous sherds reveal the following traits: Vases are either straight sided, or have constricted necks and flaring mouths. All have flat bottoms. Basal diameters range from 2 to 5 inches, while oral diameters are from 5 to 8 inches.

House 5

House 5 was about 20 feet due north of House 1 and was similar in all respects except size. The only features remaining were a small hearth with its external chimney on the north side of the house (Fig. 47), and a postmold, 3 inches in diameter, in each of the northeast and southeast corners. No similar postmolds could be found in the 2 remaining corners. Artifacts found at random throughout the fill consisted of 2 whole vessels, 2 incomplete vases, and a broken clay spindle whorl (397-058). Miscellaneous sherds found consisted of 18 rims representing 15 vessels, 129 body sherds, and 4 bases.

Vessel 1 (397059) (Fig. 44, 3) is a vase with constricted neck, flaring lip and flat bottom. It is 5 inches high, 4¾ inches across the mouth and has a basal diameter of 3 inches. The base is plain, and the sides are plain with vertical scraping marks over most of the surface. The ware is $\frac{1}{16}$ inch thick and is brown and black inside and red, buff, brown, and black outside. The rim is flaring and pointed in cross section. The paste is grit tempered.

Vessel 2 (397060) (Fig. 44, 2) is a vase with constricted neck and flaring mouth and is 4⅝ inches high. The mouth is 4⅞ inches in diameter, while the plain, flat base is 3 inches in diameter. The walls are ⅛ inch thick and are buff, brown, or black. The exterior is plain, except for vertical marks of scraping. The rim is rounded and excurvate in cross section.

Vessel 3 (397061) is a simple cup 2⅛ inches high, with a rounded, straight rim. The base is 2⅛ inches across, while the mouth is 2⅜ inches across. The untempered walls are ⅛ inch thick and red and gray in color. The base is plain, as are the outer surfaces.

Vessel 4 (397062) is the lower portion of a large vase. The basal diameter is 3$\frac{1}{16}$ inches and the walls are ¼ inch thick. The paste is grit tempered and is red, gray, black, and soot-blackened on the outside, while the inside is buff and black. The base is decorated with a conventionalized leaf design. The plain outer surface shows vertical scraping marks.

The miscellaneous sherds reveal the following traits: Vessels are simple bowls, straight-sided vases, or vases with constricted necks and flaring lips. Oral diameters vary from 7 to 11 inches, while the basal sherds show a diameter of 4 inches. All the bases found show the leaf design. Two sherds show a simple incised line near and parallel to the rim, but most sherds are plain, or show vertical scraping. Rims are rounded and either straight or excurvate in cross section.

House 8

House 8 was about 100 feet east of House 3 and was similar to those already excavated. No special features were found in this house pit, and the only fireplace found was a burned area near the middle of the north side of the house, though no external chimney could be found. Potsherds were found throughout the fill of the house, and among these were 2 restorable and 2 incomplete vessels. No other artifacts were recovered.

Vessel 1 (397064) is a vase with constricted neck and flaring rim, 6½ inches high with an oral diameter of 6¼ inches. The flat base is 3½ inches in diameter and is entirely plain. The grit-tempered walls are ¼ inch thick, red, yellow, and gray externally, and buff, gray, and black internally. The sides are plain. The rim is rounded and excurvate in cross section.

Vessel 2 (397065) is a simple, plain-surfaced bowl with straight sides and flat bottom. The over-all height is 2⅜ inches and the oral diameter is 5 inches. The base is 2⅛ inches in diameter and shows the spiral striations indicative of having been turned on a potter's wheel. The walls are ⅛ inch thick and are red, yellow, and brown both inside and out. The rim is straight and rounded in cross section.

Vessel 3 (397066) is a plain cup with an oral diameter of 4 inches and a basal diameter of 2¼ inches. The over-all height is indeterminate due to incompleteness. The walls are $\frac{1}{16}$ inch thick, buff and brown exter-

Fig. 46. Material from House 4, Ogawara Site 3. 1, 2, 5, fragments of clay tubes (397057); 3, slag from smelting of iron ore; 4, sponge iron (USNM Neg. 41879-B).

nally, and yellow and buff inside. The base shows the conventionalized leaf design. The rim is pointed and flaring in cross section.

Vessel 4 (397067) is a plain vase with constricted neck and flaring rim. The height is indeterminate. The flat base is 2¼ inches in diameter and shows spiral striations of the potter's wheel. The oral diameter is 5½ inches; the walls are $\frac{3}{16}$ inch thick. Both inner and outer surfaces are yellow, buff, and black. The rim is rounded and excurvate in cross section.

Miscellaneous sherds, including 28 rim sherds representing 23 vessels, 115 body sherds, and 12 basal sherds (all of the Haji type), 6 Jomon sherds, and 1 sherd of the Sue type were found in the house fill. The Haji sherds disclose the following traits: Both simple bowls and taller vessels with constricted neck and flaring rim are present. Diameters vary from 4 to 8 inches at the mouth and from 2½ to 4 inches at the base. Bases are all flat and show the conventionalized leaf design, spiral striations, or are plain.

"House" 10

"House Pit" 10 resembled the other pits prior to excavation, but was not a house at all. It proved to be an irregularly rectangular pit used as a quarry for potter's clay. The pit was roughly 15 feet long, 12 feet wide at its widest part, and over 4 feet deep in the center. The bottom was irregular, as were the sides. In some places the sides had been tunneled into as much as 30 inches in particular veins of the white clay. No tools were found which might have been used in the digging and no tool marks were observed. It was apparent that only the choicer white clays were acceptable, as the tunnels followed only this type, by-passing tinted, impure areas. Since only sherds of Haji type were found in the black earth filling the quarry, it is certain that it was these people who had worked the deposit.

The sherds (397072) found consisted of 11 rims representing 7 vessels, 18 body sherds, and 6 basal sherds. No restorable vessels were found in the pit. All the sherds are grit tempered and represent vases with constricted necks and flaring rims. Basal diameters range from 2½ to 3½ inches, and all the basal sherds are marked with the conventionalized leaf design. The mouths of the vases range from 4 to 6 inches in diameter, and all rims are rounded, and either straight or excurvate in cross section. All the sherds are plain, though a few show vertical striations. Two perforations for repair show that this method of salvaging vessels was used.

House 15

House 15 was located some 50 feet due south of House 4 and proved to be similar to those already excavated; the shallowest house found at this site. No fireplace or chimney was found, nor were there any other

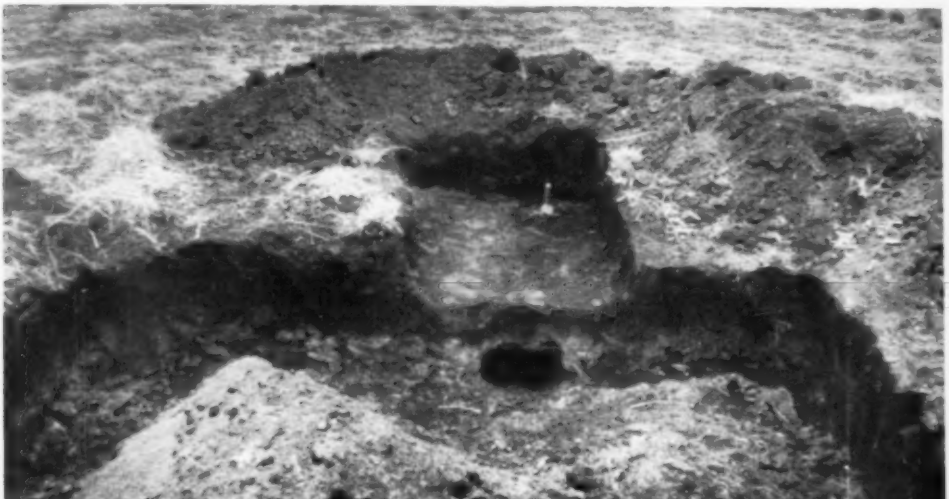

Fig. 47. House 5, Ogawara Site 3, showing external chimney 5.5 feet long.

distinctive features. In the earth filling the pit were 1 lump of baked potter's clay, 14 rim sherds representing 13 vessels, 137 body sherds, 14 basal sherds, and 1 restorable bowl; 17 of the body sherds showed black lacquered inner surfaces, the highest concentration of this type of ware found at this site.

Vessel 1 (397070) is a simple, flat-bottomed bowl made of grit-tempered, yellow clay. The height of the bowl is 2½ inches, and the mouth is 6 inches in diameter. The base is 2½ inches in diameter and shows the spiral striations of the potter's wheel. The exterior of the bowl is plain, and the rim is rounded and straight in cross section.

The miscellaneous sherds reveal the following traits: Vessels are either constricted neck vases or simple bowls. All are flat bottomed with bases ranging in diameters from 2½ to 4¼ inches. Oral diameters range from 6 to 7 inches, while rims are rounded and either straight or excurvate in cross section. Bases are either plain or show a conventionalized leaf. Two basal sherds from the same bowl show a band of 3 lines of punctations parallel to the base, 1/32 inch in diameter and about 1/16 inch deep.

Anenuma Site 2

The house pit which was completely excavated at this site proved to be identical with those found at Ogawara Site 3.

The pit was square with rounded corners. No trace of doorway, chimney, or other structure was found in the house, though 2 burned areas on the floor indicated the location of hearths. Hearth 1 was 2 feet in diameter, while under its center was a postmold 4 inches in diameter, possibly indicating a central, supporting post for the roof structure. Hearth 2 was 2¼ feet in diameter. Lying directly on the burned surface of the hearth were 2 whole cups, 1 restorable vase, and a complete rim of a bowl. Scattered through the fill of the house pit were many sherds, including those of a restorable vase (Vessel 4). Also found in the fill were a broken stone celt (396932), a broken spindle whorl (396956), and a neck of a bottle reminiscent of some ware of the Final Jomon (Kamegaoka) period. This bottle neck is oval, with diameters of 1¼ and 1 inches. The height of the fragment is 1 inch; the interior diameter is ¾ inch. The ware is gray in color and is well baked. A thin groove encircles the neck about ¼ inch below the rim. The rim is broken by 2 "ears" set on opposite sides, and each "ear" is grooved near the tip. The spindle whorl is of untempered yellow clay, well baked, and measures ¾ inch thick and 1½ inches in diameter.

Vessel 1 (396928) is a plain cup 1 inch in height, with an oral diameter of 2¼ inches. The base is rounded, 1⅜ inches in diameter, and walls are ⅛ inch thick. The clay is grit tempered and is yellow with blackened areas on both inner and outer surfaces. The rim is pointed and slightly everted in cross section. The inner surface of the cup shows distinct coils, illustrating the method of manufacture.

Vessel 2 (396929) is almost identical to Vessel 1 except that the height is 1⅜ inches, oral diameter 2⅛ inches, and basal diameter 1⅞ inches. Wall thickness is 1/16 inch. The cup is yellow, with brown and black areas. The rim is pointed and slightly everted in cross section.

Vessel 3 (396930) (Fig. 41, 3) is a vase with constricted neck, flaring rim, and flat bottom. The grit-tempered clay is red and brown on exterior surfaces and red, buff, brown, and black on interior surfaces. The outside is slightly soot-blackened. Height is 6¾ inches, oral diameter 5⅜ inches, and the base 2¾ inches in diameter. The base shows the conventional leaf design. The walls are ⅛ inch thick and are plain with vertical scraping marks. The rim is rounded and excurvate in cross section.

Vessel 4 (396931), similar to Vessel 3, 6 inches in height, has a basal diameter of 3 inches and an oral diameter of 5 inches. The walls are 1/16 inch thick and are yellow and gray on both inner and outer surfaces. The flat base is entirely plain, as is the rest of vessel. The rim is rounded and excurvate in cross section.

Miscellaneous sherds found in the house pit reveal vases with constricted necks and flaring lips, and shallow, flat-bottomed bowls. Oral diameters vary from 3½ to 7 inches. The miscellaneous sherds from the housepit total 14 rims representing 7 vessels, 2 basal sherds, and 43 body sherds in addition to the vessels described above.

Anenuma Site 4

The test area excavated at the tip of the peninsula on which Site 4 was located yielded Haji as well as Jomon period pottery.

The Haji sherds number 15 rims representing 13 vessels, 149 body sherds, and 3 basal sherds, from straight-sided, flat-bottom bowls, and vases with rounded lower portions, constricted necks, and flaring rims, plus the usual flat bottom. All the sherds are grit tempered and are usually well fired. Bases are plain and are from 2 to 4 inches in diameter. The oral diameters range from 5 to 10 inches, while walls are from 1/16 to ½ inch thick.

The edge of the test square away from the end of the peninsula touched the edge of a pit-house depression. Inside this pit house (No. 11) were 3 areas of burned earth, apparently hearths, of which one was surrounded on 3 sides by standing slabs of sandstone. This hearth measured 26 by 30 inches and was 14 inches deep. No trace of a chimney was found. Scattered in the house fill were many sherds of the Haji period, and 1 body sherd of the Sue type. Haji sherds include 51 rims representing 46 vessels, 23 basal sherds, and 318 body sherds. Also found were many fragments of sponge iron and slag. The sherds indicated vessels of 2 types, vases with rounded lower portions, constricted necks and flaring rims, plus flat bottoms, and simple bowls with flat bottoms and straight, slightly flaring sides. Bases are

plain and vary from 3 to 4 inches in diameter. Oral diameters are from 5 to 11 inches, while thicknesses of walls are from ⅛ to ½ inch.

During a few weeks in which we did not visit Site 4, persons unknown dug test holes in the center of 3 other house pits, with unknown results. One of the house pits (No. 20) was so far uncovered that we enlarged the excavation and uncovered most of the floor. It should be emphasized that the collections from this house are only samples of the original contents. Under the floor of the house a pit was found which contained some Haji pottery as well as some which appeared to be Final Jomon of the Kamegaoka type, indicating possible contemporaneity. This U-shaped pit was 40 inches in diameter and extended to a depth of 36 inches below the floor. No bones or other organic remains were found in the pit. The Haji sherds consist of 8 rims representing 8 vessels, 11 body sherds, and 10 basal sherds. Also found in the house pit fill were scraps of iron ore, slag, and sponge iron.

Anenuma Site 6

Site 6 is one of 3 fortified protohistoric sites located on the shores of Anenuma. The site is at the north edge of the headland also containing Site 12 and Site 2, and is on the south edge of a deep ravine trending eastward from Anenuma. A portion of the site is under cultivation, having been recently cleared and plowed. The remainder of the site, the western quarter, is forested and appears never to have been cultivated. The surface of the cultivated portion yields scattered sherds, flint chips, and fire-cracked stones. The sherds are predominantly of the Haji type though a few cord-marked (Jomon) sherds are found as well.

Visible evidence of a fortified village is present in a broad, shallow ditch beginning at the bluff's edge and curving in a wide, sweeping arc back to the bluff edge enclosing an area of approximately 1 acre. (Fig. 48). Irregularly dispersed within the enclosure are 20 saucer-shaped depressions varying from 20.7 to 32.0 feet in diameter and 6 to 29 inches in depth. Immediately outside the wall is a similar depression, designated as *10* on the map. Three similar pits are located in the woods to the west of the site. These are not shown but apparently are identical in nature to those in the village proper.

A trench was cut through the defensive ditch. The trench was 5 feet wide and was dug to the bottom of the black topsoil to expose the yellow clay hardpan. The topsoil averaged 32 inches in thickness and was quite densely interlaced with roots. One pit was found which extended into the clay subsoil to a depth of 7 inches. The pit was 35 by 41 inches across at the level of the subsoil. No indication of the pit appeared in the superimposed topsoil. The only artifacts in the pit were a few Jomon sherds.

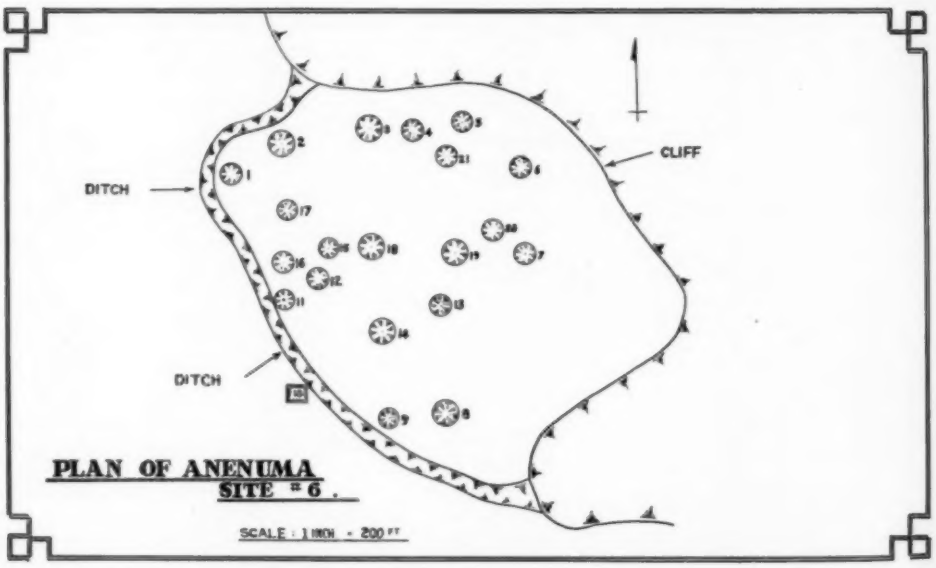

Fig. 48. Plan of Anenuma Site 6, a fortified protohistoric village.

As shown on the cross section (Fig. 49) the original defensive ditch was 8 feet wide and 4.4 feet deep from the present surface. One posthole, 10 inches in diameter, penetrated 3 inches into the hardpan. It was located at the inside edge of the original trench and may have been part of a stockade, though a widening of the test trench at this point revealed no other postmolds.

House 10 was found to be square with rounded corners, excavated into the clay hardpan to a depth of 17 inches. The floor was level and showed no trace of any specially prepared surface. Neither was there any charcoal or wood ash to indicate destruction of the house by burning. A simple hearth was found in the western corner of the house where the clay floor was burned red to a depth of 2 inches over an area 22 inches in diameter. Resting beside the hearth was a lump of potter's clay 7 by 5 by 2 inches. One side of this lump showed the imprint of wrinkles in a wrapping material, probably a skin. No postmolds were observed which might represent roof supports. No indications of doorway, chimney, alcoves, or storage pits were found.

The artifacts found in the fill of the house pit consisted of sherds of the Haji type, one scrap of iron, flint chips, and many fragments of baked clay tubes (397004) similar to those found at Ogawara Site 3.

The 355 Jomon-type sherds found on the surface of the site, in the small pit in the test trench, and in the test trench itself indicate an occupancy by Jomon peoples prior to that of the Haji people. The Jomon sherds represent at least 19 flat-bottomed, straight-sided, plain-rimmed, grit-tempered vessels. A few basal sherds show impression of split-bamboo matting. Interior surfaces are red, yellow, buff, or black, and are smooth. Exterior surfaces are cord impressed in patterns typical of the Early Jomon. No other artifacts or remains were found which could be attributed to the Jomon people.

Pottery representing the occupation of House 10 is typical of the Haji period and consists of 90 sherds representing 11 vessels. The vessels are vases having flaring lips, constricted necks, expanded bodies, and flat bottoms. Diameters of rims are from 4 to 7 inches, and of bases from 3 to 5 inches. Vessel walls are thin, ranging from ⅛ to ⅜ inch. Exterior and interior surfaces are plain and range from red through yellow, buff, brown, and gray to black. A few exterior surfaces show marks of vertical scraping, and a few basal sherds show a leaf impression. No appendages appear on vessels of this type.

Anenuma Site 12

Site 12 is a fortified village of the Haji period similar to Site 6. It lies ½ mile east of Site 2 on the top of a hill overlooking one of the many valleys which enter the main valley of Anenuma from the east. The site is immediately west of the center of Misawa Air Force Base and is under cultivation. Surface indications of a village are scarce, but consist of small fragments of Haji pottery and occasional flint chips. Many round pit-house depressions are scattered over a 2-acre area enclosed by a shallow ditch. The house pits were not accurately counted or surveyed, but at least 20 depressions are observable. One of these was especially deep, the bottom being at least 3 feet below the present surface. The site was visited only once, and no collection was made nor excavation attempted.

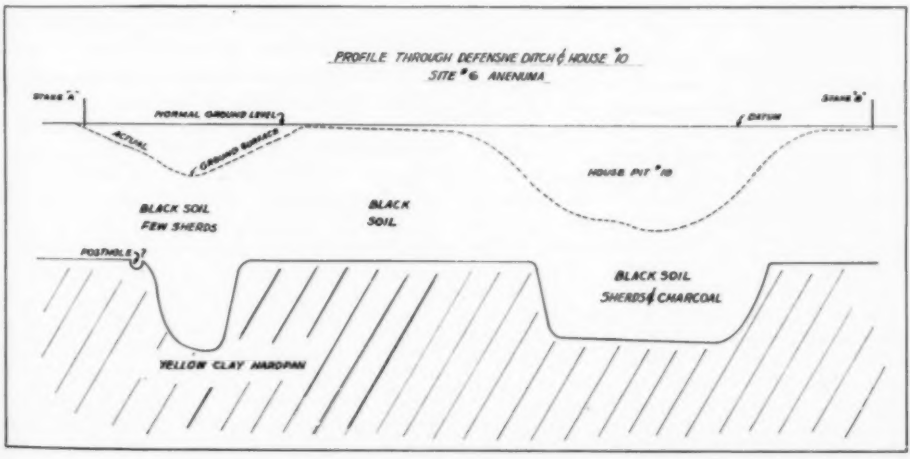

Fig. 49. Cross section of defensive ditch at Anenuma Site 6. Horizontal scale, 1 inch to 15 feet; vertical scale, 1 inch to 3 feet.

Ogawara Site 2

Ogawara Site 2 is a concentration of pit-house depressions located on the east bank of Ogawara-numa about 1 mile north of the outlet of Anenuma. No excavations were undertaken at this site nor was an accurate survey made of the area.

Sites on Mutsu Bay, Aomori

In April, 1949, on a reconnaissance trip to Ominato, on the peninsula which encloses Mutsu Bay on the east, several sites were located which it is desirable to record. The exploring party, consisting of the writer and a Japanese driver-interpreter, started at Noheji and proceeded up the east side of Mutsu Bay through Yokohama and Tanabu to Ominato. At each likely spot a brief search was made for aboriginal sites. Three sites were located.

Site 1 was located on a peninsula between 2 creeks at the western end of the high ground, overlooking the salt marshes along the Bay. The site is about 40 feet above sea level, and is just north of the town of Yokohama, Aomori Prefecture. The soil is sandy and under cultivation. Surface indications in the form of sherds, chips, and fire-cracked stones litter the ground over several acres. Where the road cuts the peninsula, sherds and chips are found on the banks of the roadcut. In one place a hearth 16 inches below the surface was exposed by the road construction. On the surface and in the fireplace were found the following sherds which, with few exceptions, were of the Haji period:

19 rims representing 18 vessels
34 basal sherds, including 2 pedestals
360 body sherds, including several of the Sueki type

The Haji sherds reveal the following ceramic traits: Vessels are vases with constricted necks, flaring rims, and flat bottoms. Oral diameters are from 3 to 8 inches, basal from 2 to 4½ inches. The bases are flat and usually plain, though a few show spiral striations, and one sherd has a pebble-dash effect of multicolored stones, as if the wet clay vessel had been set on loose sand before firing. Colors are red, buff, brown, and gray. All of the sherds, except the Sueki, are entirely plain, without surface workings or design. Rims are rounded and straight or excurvate in cross section, or square and excurvate, while a few show a thickened rim. The only appendages are pedestals (397088), of which 2 were recovered in the ashes which filled the hearth in the roadcut. These pedestals are 5 inches high with bases 2½ and 3½ inches in diameter narrowing abruptly to a shaft diameter of 2 inches. The paste is red, gray, and brown and is grit tempered. The shafts are perforated from the center of the base up to the top of the shaft where it presumably was attached to the bottom of a vessel of some sort. Unfortunately, no trace of the vessel itself was found, though every sherd was saved, washed, and examined. No bones were recovered and no stone implements, despite the profusion of flint chips. No excavations were attempted other than the troweling through of the exposed fireplace.

Site 2 is on a plateau 1 mile east of the town of Kawauchi, which is west of Ominato, on the north shore of Mutsu Bay. The site is about 40 feet above sea level, and is on the east side of a small creek flowing into the bay from the north. The surface is under cultivation but shows 6 or 7 house-pit depressions, indicating that the site was only recently put under cultivation. Around these house pits are found a few shells, many fire-cracked stones, a few chips, and many sherds of the Haji period. No collections were made, nor were excavations attempted.

Site 3 is a large shellheap located on a hilltop about 60 feet above sea level at Saibana, between Tanabu and the town of Mena. Surface indications are found over several acres, and include comminuted shells, bone fragments, many sherds, and occasional flint chips and implements. The sherds are of the Jomon period, both Middle and Later Jomon. A local informant states that the shell deposit is about 1 m. in depth, and that 2 local archeologists, Mr. Ishizawa and Mr. Nakajima, both of Tanabu, excavated a test area about 10 m. square. The cultural material they recovered had been sent to the National Museum in Tokyo. No collections were made, nor were excavations undertaken by the writer.

Summary

The following table summarizes the physical characteristics of the house pits explored and may facilitate comparisons with other excavated house pits in the same or other areas.

The Ogawara Pit-house culture is the name given to the culture represented by the hundreds of pit-house depressions which can be found adjacent to lakes and water-courses in eastern Aomori Prefecture. Some of the house pits occur in groups, though many are found scattered at random. Some of the groups of pits are fortified by a wall of earth or by a ditch, presumably used in conjunction with a stockade. At the present writing it is not possible to assign definite dates to the culture, though its general placement is known. It follows the Jomon period, though some overlap with the Final Jomon is hinted. The people knew the manufacture and use of iron objects, so that they can safely be termed "protohistoric." Knowledge of iron was introduced into southern Japan from Korea around A.D. 200, and may have reached northern Honshu shortly after. The pottery known as Sueki is a hard, gray, wheelmade ware introduced into

Table 8. Details of Pit Houses.

Site and House	Length in Feet	Width in Feet	Depth in Inches	Features
Ogawara Site 3				
House 1	14.3	13.0	36	Hearth with external chimney.
2	15.1	13.3	32	2 hearths, 1 with external chimney; charred roof members.
3	20.0	18.0	42	2 hearths, 1 walled and with external chimney with 2 horizontal tunnels leading to vertical flue; charred roof members.
4	16.8	16.5	36	Complex hearth used for iron smelting; no chimney.
5	10.0	8.5	36	Hearth with external chimney; postholes in 2 corners.
8	14.3	13.8	32	Plain hearth, no chimney.
15	12.9	12.5	22	None
Anenuma Site 2				
House Pit	13.5	13.0	26	2 plain hearths, no chimney; 1 central postmold.
Anenuma Site 4				
House Pit 11	20.0	19.0	40	3 hearths, no chimney; 1 hearth enclosed by slabs.
20	19.5	13.0	28	Plain hearth, no chimney; subfloor pit.
Anenuma Site 6				
House Pit 10	16.5	16.0	49	Plain hearth, no chimney.

Japan from Korea in the 5th century, so that the Ogawara Pit-house culture must be later than this event. Historic records for the region are not available prior to around A.D. 800, so that the terminal date for the culture can only be approximated. No site explored by the writer shows any signs of rebuilding activity, that is, the house pits show only one phase of construction, with no enlargement or replacement of structural members. Also, the amount of refuse in the topsoil and on the surface indicate that the occupancy of the village was of short duration only. It appears, therefor, that the Ogawara Pit-house culture flourished subsequent to the 5th century A.D. for a short period, possibly one generation only.

No skeletal remains of the people have been found, nor is there any other evidence to indicate the racial identity of the people. It is most likely that they were the ancestors of the present-day Japanese who reside in the area, though of course definite proof is lacking. The evidence of destruction of several houses by fire and the presence of intact pottery vessels in some houses hint at hasty abandonment of the sites, possibly as a result of warfare. The fortified condition of several sites further indicates strife, or fear of attack.

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1908 *Prehistoric Japan*. Yokohama.

Laurel, Md.
June, 1954

CHARCOAL CONCENTRATION FROM EARLY SITES FOR RADIOCARBON DATING

FREDERICK R. MATSON

CAN FLECKS of charcoal in soils and hearths be concentrated into a usable sample for radiocarbon dating? It is impracticable to ship large volumes of soil with low carbon content from distant sites, yet dating them may be most important. This question was informally discussed following the Wenner-Gren Conference on African Prehistory held at the University of Chicago in February, 1953, and as a result Robert J. Braidwood proposed that an experimental field laboratory be established that summer at an excavation where water and electricity were available if needed. The Department of Anthropology of the University of Chicago and the Illinois State Museum were sponsoring the excavation of a rock shelter near Modoc, Illinois, and I was invited to conduct experiments there, trying out any technics that I wished. It was hoped that these experiments would result in establishing a simple procedure that could be used in many parts of the world for procuring radiocarbon samples. They did.

Acknowledgments. The Wenner-Gren Foundation for Anthropological Research, always interested in developing new technics applicable to archaeological studies, generously financed the field work. The codirectors of the excavations at Barbeau Creek, John Buettner-Janusch and Howard Winters, together with their genial crew of university and high-school students, greatly facilitated the work through their hospitable and cooperative interest in the project. Thorne Duel, Director of the Illinois State Museum, and S. L. Washburn and R. J. Braidwood of the Department of Anthropology of the University of Chicago organized the expedition and facilitated the use of it for my field laboratory. W. F. Libby very kindly read this report in manuscript. His active interest in the problem greatly added to the pleasure of the work. Figures 50, 52, 53, and 55 are from photographs taken by Buettner-Janusch; Figures 51, 54, and 56 are reproduced from Kodachrome slides.

As the final draft of this paper has been prepared in southern Kurdistan, and communication with the editor would be difficult at this distance, John Buettner-Janusch has proofread the galleys. For this help I am most grateful.

The Site. The Barbeau Creek Rock Shelter (also known as the Modoc Rock Shelter) is at the base of the limestone-sandstone bluffs along the Mississippi River between Modoc and Prairie du Rocher in Randolph County, Illinois, opposite Ste. Genevieve, Missouri. The site, Ra 501, is shown in Figure 50. The original height of the soil against the bluffs, before bulldozers had removed some for road building and had thus exposed ash lenses, can be seen to the extreme right and left in Figure 50. The deepest excavations were carried out in 2 adjacent 5-foot squares to a depth of almost 26 feet below the original soil line.

The earth was firm, so good profiles could be maintained in the squares as they were taken down in 6-inch layers. The upper brown and lower tan deposits of fine sand and clay with a banded zone of yellow sand between them constitute the major divisions of the profile in which frequent red burned hearth zones, white ash lenses, and thin dark bands rich in charcoal lumps up to ½ inch in diameter occurred. The term "charcoal" in this paper is used interchangeably with "carbon" to designate discrete black organic fragments found in the soil. It is possible that not all of the black material was the result of burning, for some could develop from the long-time action of humic acids in the soil. The dark layering and flecking can be seen in Figure 51, which shows the profile at the bottom of the deepest occupation level. Another profile of this basal area has been illustrated by Buettner-Janusch (1954, Fig. 32).

Many small pieces of charcoal were scattered at depths other than those of the dark banding. There was usually an inch or two of almost charcoal-free earth above the red burned areas, and on top of this occurred the charcoal concentration. The ash lenses contained few black flecks.

Sample Selection. This should be emphasized as a most critical part of the whole process. Unless the sample from the excavation is from a carefully established level and area and is associated with archaeologically significant material for which a radiocarbon date is of great value, it should not be submitted. There should be no question as to either the

exact find spot or the possibility of later intrusion into earlier levels. Documentation with photographs and botanical identification of the charcoal is desirable. Care in the preservation and shipping of the specimen so that it is free from organic contaminants is obviously essential. Knowledge of the nature of the soil, drainage, and weathering at the find spot is helpful. Because it is an expensive process to determine a radiocarbon date, it cannot be undertaken except on well-considered samples.

In preliminary discussions with Libby before experimental field work on carbon concentration at the Barbeau Creek Rock Shelter was started, he generously agreed to have up to 6 determinations made so as to test the possibility of concentrating carbon in the field. He ultimately treated 8 samples. The emphasis was on the methods of treatment and agreement between dates, rather than the actual age of the site, although it was felt that Barbeau Creek had occupation levels of reasonable antiquity.

Following preliminary experiments, and after a sorting and archaeological evaluation of the carbon samples available for processing, a conference was held with Robert J. Braidwood and the field codirectors, John Buettner-Janusch and Howard Winters. At this meeting the data available were thoroughly reviewed and agreement was reached on the patterning of the 6 samples to be processed and submitted to Libby. Two samples from each of the major 3 deep carbon-rich layers would be prepared and sent to Chicago for analysis. In actuality, 4 from each of the 3 levels were procured so as to be available if needed:

Sample 1. A hand-sorted concentration.

Sample 2. A water concentration retained on a 14-mesh and a 20-mesh screen.

Sample 3. The finer water concentration retained on a 115-mesh screen.

Sample 4. A control sample as excavated, with no processing.

Processing. The excavators carefully saved large samples of the charcoal-rich layers, placing them in glass jars with screw caps and covering the mouth of each jar with aluminum foil before applying the lids. Masking tape was used for labels. Particularly large chunks of

FIG. 50. Barbeau Creek Rock Shelter near Modoc, Randolph County, Illinois.

FIG 51. Level C profile showing charcoal banding at the lowest occupation level.

charcoal or black soil were carefully wrapped in foil before being placed in the containers. The group of jars from adjacent 5-foot squares and from the level that was to constitute a sample were handled as a unit.

Two-quart, 1-quart, and pint jars were used, depending on the size of the sample. A processed field sample of about 28 grams of charcoal is highly desirable so that sufficient chemically pure carbon can be obtained in the laboratory for one determination and with a reserve for a check run if needed. A new process of greater precision for radiocarbon dating that has been developed by J. R. Arnold will require field samples about 2 kilograms in size.

Since it was found that some of the carbon lumps tended to disintegrate into finer particles and fibers in water, the materials were first hand-sorted so as to obtain the richest possible concentration without further treatment. A sheet of aluminum foil was placed on the sorter's hand to avoid any possible contamination with perspiration, and a convenient amount of material was poured from a sample jar onto the shielded hand. Excess dirt was removed with a teasing needle or a narrow, sharp-edged spatula, and the black lumps, fairly free of soil, were poured into a pint jar. The residue was placed in a clean bucket. The contents of all the jars from one level were examined in this manner and the concentrate, slightly damp, was capped first with a protective aluminum foil seal and then with a screw lid, and labeled *Sample 1*.

Water was added to the bucket containing the charcoal-flecked residue. (Only a total volume equivalent to 2 full quart jars was treated in one bucket at a time.) The water-soil mixture was gently stirred by hand so as to disintegrate but not pulverize any lumps present and to free charcoal trapped in the lower layers in the bucket. Some of the charcoal floated to the top of the water, as can be seen in Figure 52, part of it being trapped in small islands of foam. There was a wide range in the grain size of this floating charcoal, which either contained enough entrapped air to make it buoyant or was carried with the foam. The slurry was carefully poured through a sieve formed from copper screening into a clean wash basin (Fig. 53). When sand or gravel appeared near the rim of the bucket, the pouring was stopped, for the cleanest possible separation of the carbon was desired.

Fresh water was added to the bucket, the sediment was gently stirred to release further carbon, and a second pouring was made onto a duplicate sieve. The bucket was vibrated gently as pouring continued, causing the remaining charcoal to concentrate on top of the gravel, from whence it could be poured out with a minimum of rock contamination. The material caught on the second screen was washed with additional water. In Figure 54, where the charcoal concentrations from the

FIG. 52. Charcoal-flecked soil sample in water.

FIG. 53. Pouring sample onto 14-mesh copper screen.

first and second pourings are shown, the gravel contaminant on the second screen is very apparent. Bits of nutshells and charred bone occurred in some of the concentrates. The water, clay, and sand that passed through the screens still contained much fine charcoal, as can be seen in the central basin in Figure 54, and was saved for further treatment while the 2 screens containing the samples were dried. We had the luxury of an electric oven, but the sun would serve if the concentrates were protected from dust. It is well to place a sheet of aluminum foil under the sieve during the drying process to catch the finer-grained material that drops through the screen. A similar sheet placed loosely above the sieve helps prevent contamination.

The relatively pure material from the first screen was placed in a pint jar, and to it was added the charcoal from the second screen that could be salvaged from the gravel with tweezers or spatula in a reasonable length of time. Hand-picking grains of charcoal from a dried sample is a very slow process. It comes as a surprise to one when he sees how large a volume of charcoal is needed to weigh 1 gram. To cite but one example, in a washing that contained considerable carbon in grains no larger than ⅛ inch in diameter, it was possible with tweezers to separate 1.2 grams in half an hour. A slightly faster method in some cases was to spread a thin layer of charcoal-gravel on a narrow spatula and to guide the charcoal off one edge with a teasing needle and the waste material off the other edge. Since it is desirable to procure a field sample of carbon-rich material weighing about 1 ounce or 28 grams, the time involved in hand picking fine grained material is usually prohibitive. If the total charcoal sample is small, it would be best to retain all of the material from the second screen for chemical separation of the carbon. The material thus concentrated constituted the major part of *Sample 2*. The sand and gravel remaining in the bucket was discarded after examining it for the types of shells, rocks, and minerals that occurred in the coarser fraction of the soil.

At this stage several basins such as the one in Figure 54 were full of water in which fine charcoal was floating. In the bottom of each basin was a sediment of clay and sand containing a considerable amount of fine charcoal that could be concentrated as in the buckets by slight vibration. The water and concentrate in these basins was poured through a 20-mesh sieve, which was then washed several times and dried. The material retained on the sieve was examined under a hand lens, and if it was sufficiently rich in charcoal and in large enough quantity to chance the possible contamination from fine rootlets that could not be removed with tweezers, it was added to the 14-mesh material and together they were termed *Sample 2*.

Similar treatment with a 115-mesh sieve was given the remaining fine grained charcoal in the water and sediment (Fig. 55). The concentrate thus obtained, *Sample 3*, possibly con-

FIG. 54. Charcoal from first (right) and second (left) pourings on 14-mesh copper screen. The water in the basin contains charcoal finer than 14-mesh.

FIG. 55. Charcoal on 20-mesh screen. The basins contain charcoal-rich sediments that have passed through the sieve.

tained contaminants in the form of (a) rootlets, (b) siltlike materials that may have been derived from the decayed roots of the deep-probing ailanthus trees that grew on the site, and (c) swamp debris deposited during flooding. This fraction can be concentrated easily, but its value for dating should be considered carefully in the light of the structure of the deposits at the level in question.

If additional carbon is required from specimens of limited volume, the sediment remaining in the basins, which can be seen in Figure 55, may be given a simple panning treatment which will concentrate the charcoal near the thin edge of the material in the tilted basin. From there it can be removed with a spatula, and a sample can be obtained containing some clay and sand but fairly rich in very fine charcoal and silt.

A control specimen, *Sample 4*, was included in each of the 3 groups in case some untreated material was needed for further testing after the radiocarbon analyses had been made. It was fortunate that this was done, for it was useful in the evaluation of the results in the B-series. A jar of material as collected and sealed in the excavation, and not opened in the field laboratory, constituted *Sample 4*.

Ash lenses, consolidated by lime and containing many fine shell fragments, were examined as possible sources of carbon since they were associated with many of the burned areas. Disintegration of lumps of ash with dilute hydrochloric acid did not free an appreciable amount of carbon, and that which did appear was in extremely fine form. An analysis of an ash lens sample in Libby's laboratory showed that it had a very low carbon content and was not useful material for radiocarbon dating. Unconsolidated ash very quickly settled to the bottom of a bucket of water as a thick resistant sludge. Four quarts of calcareous ash yielded only 2.1 grams of carbon that was retained on a 14-mesh screen. Another 2 quarts yielded 0.4 grams. Therefore, at Barbeau Creek it was not profitable to use ash deposits as sources of carbon.

FIG. 56. Burned clay hearth, or parching floor section, at deepest occupation level (C).

Equipment. The experiments and procedure just outlined require but simple apparatus that can be carried in the field. The following list is suggestive rather than mandatory, for as in any archaeological operation, the equipment used is conditioned by availability and by local circumstances.

1. Sample containers. Glass jars were used at Barbeau Creek, but packing and shipping them any distance would not be practical. Libby uses a polyethylene plastic tubing, such as is employed to package fresh vegetables, for the storage of his specimens, and it is currently being used in some field work. The tubing can be cut into sections and sealed with heat into air tight envelopes that prevent contamination and are easy to pack. One supplier of such tubing in several widths is the Visking Corporation. The trade name for the product just described is Visqueen.

2. Water — clear and free from organic contaminants.

3. Sieves. Copper window screening, which is approximately 14-mesh in size, can be obtained easily and shaped into sieves of the desired size. Finer material can be caught on other sieves — 20-mesh, and possibly 60- or 100-mesh. The exact size is not critical. A 115-mesh sieve was used at Barbeau Creek because it was available. In most cases such a fine-meshed sieve will not be needed.

4. Buckets, wash basins, or similar vessels. These must be clean, free from any film of soap or grease. It is best to procure vessels which can be kept for the work of carbon concentration, once they are clean.

5. Small spatulas or knives, teasing needles, tweezers, camel's hair brushes, and so on, for handling and transferring the materials.

6. Drying facilities. Dryness is not essential but is desirable if the specimens are to be stored for a long time. It is recommended. Precautions should be taken so that no organic material or dust can contaminate the samples while they are exposed and drying. A sheet of aluminum foil placed loosely over the sample can provide such protection in many cases.

7. Aluminum foil. This is a most useful material for wrapping samples in the field as well as for protecting them during processing.

8. Scales. These are useful to ensure adequate size of samples but are not essential.

Analysis of Radiocarbon Dates. Three levels rich in charcoal deposits were selected for dating from among those available at Barbeau Creek. These levels, A, B, and C, their range in depth, the dates obtained and their standard deviations are given in Table 9. In order to present a coherent picture of the age of the levels and the effect of processing upon the dating of the samples, B-2*, prepared from B-4, has been substituted in Table 9 for B-2, and B-2 and B-3 have been listed separately. A graphical representation of the dates, showing the range in standard deviation and the time scale in both years B.P. (Before Present) and B.C., appears in Figure 57.

Level A, a band 8 inches in width in the brown sandy silt that was typical of the upper portions of the deposits, occurred a few inches above a zone rich in red burned clay areas and white lenses of ash and comminuted shell. The charcoal concentration (including nutshells) began an inch or two above the level of burned clay hearths or parching floors. Worked flints and flint chips were particularly abundant in Level A. A copper awl and a fragment of a ground and polished bannerstone also occurred in this important fairly broad occupation band.

Level B, which was about 5 feet below A, was composed of samples taken from a brown band a foot in width that was streaked with black and was just above ash lenses and burned red clay patches. It was rich in cultural material. It can be seen at the top of Figure 32 in Buettner-Janusch's 1954 report. Below this level was a sterile zone of fine yellow banded sand. Nutshells were common in the coarser charcoal fraction and a rich separation of black silt was retained on the sieves.

TABLE 9.

RADIOCARBON DATES (BEFORE PRESENT) OF BARBEAU CREEK ROCK SHELTER.

Level	Sample No. / Depth in inches	1	2	2	3
A	168-176	5955±235	5268±230		
B	240-252	8546±380	*7800±900	10,947±800	11,200±800
C	280-297	10,651±650	9101±440		

* *Prepared from B-4.*

Level C, representing the earliest occupation of the site, is illustrated in Figure 51. In order to procure enough charcoal from the small area that was excavated at this depth (2 5-foot squares, 30L5 and 30L10) it was necessary to combine samples over a zone 2 feet in depth. Most of the sample came from the 2 dark bands in Figure 51 that were about a foot apart. A little beneath this lower band one of the earliest features of the site, an extensive oval red burned area, was found and half of it can be seen in Figure 56. There was a thin layer of ash on the upper surface of this hard burned area, but again the layer of charcoal occurred a couple of inches above the burned zone. Relatively few flint implements occurred in Level C.

The hand-picked concentrations of charcoal, A-1, B-1, and C-1, show progressively increasing age with depth, as can be seen in Table 9. The date of the earliest occupation so found at the site, Level C, suggests that man was living east of the Mississippi River at the same time and even earlier than some of the famous early man sites from the West and Southwest. Levels A and B have dates that are of great interest in tracing the development of the Archaic horizon.

The dates for the material concentrated on the 14-mesh and 20-mesh sieves, A-2, B-2*, and C-2, are slightly less than those of the hand-picked samples. More precisely, they are 11.5, 8.7, and 14.6% less than A-1, B-1, and C-1, respectively. This consistent difference suggests that in washing the material and concentrating the charcoal on the coarser sieves there has been an increase in the quantity of more recent organic matter included in the sample, such as rootlets. The soil included in Sample 1 may also contain older organic material than the charcoal and so increase the radiocarbon age of the specimen. The difference in apparent age of the 2 concentrates from the same level is in the direction that would be expected. Thus washing and sieving can be used to procure a sample for radiocarbon dating, but it may have a date slightly younger, in the order of 10%, than a hand-sorted specimen. It is well to examine the concentrates under a binocular microscope or with a hand lens and to extract all possible organic impurities with tweezers, but the separation of all of the fine rootlets at Barbeau Creek was impossible in a finite period of time. The fact that C-2 is 14.6% less than C-1 may be due to the 2-foot spread in the width of the band that constituted level C. It is quite possible that proportionally more of the C-2 frac-

tion consists of the upper dark bank seen in Figure 56 than of the lower, and that the reverse is true in C-1.

The dates obtained for B-2* and B-3 agreed well with each other, but the mean values were about 34% older than B-1 and 3% older than C-1. This apparent anomaly may be correlated with the fact that there was a rich black aggregate of silt which was caught on all 3 sieves, much of it having the appearance of the silt that is found in swamps. It will be recalled that Level B was from the lower portion of the brown sandy silt that rested on a banded zone of sterile yellow sand, and it is probable that some jars of the B level sample consisted of a swamp deposit. The relatively great age of these silts is another matter and cannot be completely explained at present. Factors that contribute to it are the long accumulation from many sources of organic materials in a swamp, the leaching action of the humic acids in the swamp waters, and the effect of fine grain size with the greatly increased surface area on which differential leaching may occur. John P. Miller, Assistant Professor of Geology at Harvard University, with whom I have discussed the matter, considers the third factor the most important. It may be that C^{13} analyses and the study of other swamp and bog deposits would be desirable.

Following a thorough discussion of the results with Libby, sample B-4, which consisted of charcoal-flecked soil untouched after it had been excavated, was treated at the Institute for Nuclear Studies. There was no suggestion of swamp silts in this jar of material. The coarser pieces of charcoal were isolated, using the Sample 1 technic; the residue after being mixed with water was washed through a piece of copper screening, and the material trapped on it was combined with the hand-sorting. The date determined, which was 8.7% less than B-1, was reasonable.

The radiocarbon dates must be evaluated in the light of their standard deviations — which some people tend to ignore. Libby (1952) has discussed the matter, and Zeuner (1952: 415) has recently emphasized it. The standard deviation of a series of measurements, assumed to be random, expresses the range within which about ⅔ of the counts of the same or a closely similar sample would fall. That is, the date of the true radiocarbon date for a sample has 2 chances out of 3 of being within this range, but it is statistically possible that it is beyond this range. If the overlapping of the range of dates is important in an archaeological analysis, it would be well to consider twice the standard deviation as the spread on both sides of the mean. The large standard deviations reported for some of the dates in Table 9 simply indicate that the number of counts made on the sample was not enough because of time limitations to produce a good normal distribution of the data. The chances are rather good, in the light of Libby's experience, that the mean value would not be significantly changed

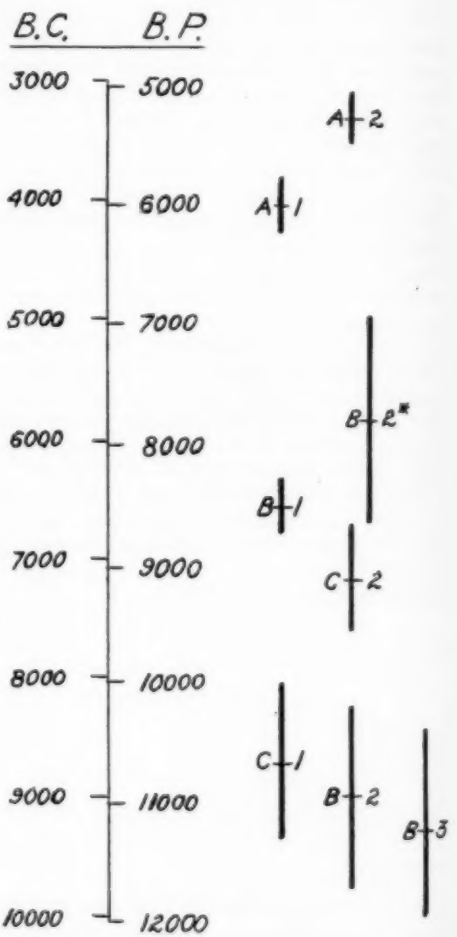

Fig. 57. Graphical presentation of the mean radiocarbon dates, plus and minus their standard deviations.

by making additional counts for a period of several days or weeks and thus reducing the standard deviation.

The spread in the radiocarbon dates using ± the standard deviation has been shown diagrammatically in Figure 57. There it can be seen that A-1 and C-1 do not overlap A-2 and C-2 in spread of the dates, but that B-2* does overlap B-1. Since B-2* consisted of a combination of the hand-sorted material and that collected on a coarse screen, and the standard deviation was large because the count was not continued as long as in the other dates, this overlap is not surprising. The lack of it in the A and C levels suggests that there is an important difference between the 2 types of samples, 1 and 2. Reasons for this have already been discussed. The chart also shows that B-2 and B-3 are of essentially the same age as C-1, which may have geological implications in the study of the formation of the deposits. It is hoped that if work is resumed at the site on a more extensive scale, a soil geologist will be able to spend some time there while the excavations are in progress.

The dates obtained for A-1, B-1, and C-1 may be used to estimate the rate of soil build-up at the site if it is assumed that the rate of deposition has been fairly uniform over a long period of time. The dates and their relative depths suggest that 1 foot of soil accumulated every 400 to 700 years. It is probably more than coincidence that the 15 feet of soil that have accumulated since the occupation of Level A would have required 6000 years at the rate of 1 foot per 400 years, and the date of A-1 is very close to 6000 B.P.

Other technics for the concentration of carbon in the field are possible but they involve more elaborate equipment. Since the major objective of the work was reduction in sample bulk with the resulting enrichment of the material submitted for analysis, a complete separation of the charcoal from all of its natural contaminants is not necessary. The process just described is useful when discrete particles of charcoal over ⅛ inch in size occur in the deposits. It would be wasteful to use it when the carbon is present as extremely fine-grained thin bands of dark gray or black material. Patient exposure and separation of such bands from the surrounding matrix should suffice in the field.

Conclusions. (1) The concentration of organic samples in the field for radiocarbon dating with simple equipment is feasible when it is necessary to reduce the bulk before shipping. The technics used must be determined by the nature of the local problem. In general, the less the material is handled in the field, the better. (2) The hand-sorting for concentration of charcoal-flecked soil samples results in dates about 10% older than those from materials concentrated with water on 14-mesh and 20-mesh sieves. The adherent soil remaining after hand-sorting may contain older organic substances, and the washed fraction may contain proportionally more recent organic inclusions such as rootlets. If the former is true, the washing of the charcoal grains, despite loss of some material, would be advisable when the date of occupation of the level is the point to be established. When a sample composed of burned logs, nutshells, or date pits, for example, is available that can be directly associated with man, it will be a more desirable sample than a concentration of charcoal in the soil at hearth levels. (3) The organic content of soils at excavated sites, whether natural or induced through occupation by man, is a complex problem involving the chemical atmosphere and history of the deposits, but it is an intriguing one well worth study by archaeologists in collaboration with soil scientists. (4) The careful field evaluation and selection of samples to be submitted for dating is of the utmost importance. (5) The antiquity of man east of the Mississippi River would appear to be of the same order as in the western and southwestern United States.

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October, 1954

OBSERVATIONS ON THE BUTCHERING TECHNICS OF SOME ABORIGINAL PEOPLES NUMBERS 7, 8, AND 9 *

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THE FOLLOWING 3 papers continue a series of brief articles on this subject appearing from time to time in AMERICAN ANTIQUITY (Vols. 17, 19). Each paper presents a group of raw data with some brief suggestions for their interpretation. All but one are the result of the study of materials recovered from archaeological sites excavated by the River Basin Surveys program of archaeological salvage in the Missouri Basin. That one (No. 6) dealt with an elk specimen from Michigan. Paper Number 1 was concerned with the analysis of the antelope bone from 2 sites in the Angostura Reservoir, South Dakota. Number 2 dealt with the bison bone from 2 earth-lodge villages sites in the Oahe Reservoir near Pierre, South Dakota. Number 3 compared the use of small and large animals as food in one site in the Garrison Reservoir, North Dakota. Number 4 was a comparison of the treatment of bison bone from 3 earth-lodge villages, 2 in Oahe Reservoir and one in Garrison Reservoir. Number 5 dealt with the bison bone from the site in Garrison that was studied in Paper Number 4 and compared it with the bison bone from another Oahe Reservoir village. Number 6 approached the problem from a different angle, being the study of butchered animal remains away from the village. The following 2 papers, 7 and 8, are studies of the dog bone remains from 2 sites in Oahe and Garrison reservoirs and Number 9 is a comparison of the bison and elk bone from a site in Garrison Reservoir. It is hoped that other such studies will continue to be made from time to time. When a large enough mass of data are accumulated in this manner, a detailed study of butchering technics should be attempted with full investigation of the ethnographic literature of the whole subject of prehistoric animal food preparation. Until a good deal more archaeological data of the present sort are brought into focus, however, such a study would be premature.

Although many archaeological sites in the Missouri Basin have been excavated by the River Basin Surveys unit of the Smithsonian Institution and by the cooperating state agencies, only 2 of these have yielded enough skeletal material of aboriginal dogs to permit this type of study. However, these 2 studies show a very wide contrast in the number of individuals recorded per number of houses excavated. From the Buffalo Pasture site (Paper No. 7) there were 32 individual dogs recovered from 3 excavated dwellings and 1 ceremonial lodge. From the Rock Village (Paper No. 8) there were only 8 individual dogs recovered from 13 dwellings. This is a greater contrast than that found in the frequency distribution of the bison bone from these same 2 sites (Paper No. 3). The contrast in the archaeologically recovered dog bones from these 2 sites is so great as to leave little doubt of the wide variety of customs existing in prehistoric times among the different peoples in regard to dog feasts.

NUMBER 7: THE DOG BONE FROM THE BUFFALO PASTURE SITE

THE MORE THAN usual amount of dog bone recovered from the Buffalo Pasture site (39ST6) near Pierre, South Dakota, invited an examination of the frequency distribution of the skeletal elements (Table 10) on the chance that inferences could be drawn concerning the role which the dog played in the people's diet.

The greatest number of individuals represented by any single element (32) is only 24% of the number of bison (138). Also, when we consider the very great difference in size between the 2 animals the alimentary contribution of the dog becomes very small indeed. It would appear then that the dietary role of the dog was probably equivalent to that of fried chicken in the rural diets before the days of electric or kerosene iceboxes — that is, for special guests or an occasional meal of fresh meat, or ceremonial feasts. Also it is conceivable that

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the dog may have served as emergency rations, but with the abundance of game in this area till after the middle of the 19th century such instances would indicate unusual circumstances. Such circumstances can be envisaged during a severe blizzard or when an agricultural village was besieged by a hunting tribe.

Many of the limb bones were entire but some were broken and others appeared to have had one or both ends chewed off. The habit of eating the cartilage and soft spongy bone on the ends of ribs and limb bones of food mammals is not uncommon today among peoples of European extraction and can be expected in aborigi-

TABLE 10. FREQUENCY DISTRIBUTION OF THE DOG BONE FROM THE BUFFALO PASTURE SITE.

Element	Mature			Immature			Worked	Total	% of greatest number
	Rt.	Lt.	Ax.	Rt.	Lt.	Ax.			
skull, occiput			8			1		9	28
" , horn cores									
" , maxilla	13	13		5	7			20	62.5
mandible	13	25		7	7			32	100.0
vertebra, atlas			15			3		18	56.0
" , axis			8			3		11	34.4
" , cervical			5			2		7	21.8
" , dorsal			2			1		3	9.3
" , lumbar			2			3		5	15.6
" , sacral			2			1		3	9.3
scapula	8	13		10	4		1	24	75.0
humerus, proximal	3	6		2	2			8	25.0
" , distal	13	18		6	4		2	26	81.2
radius, proximal	7	15		5				20	62.5
" , distal	7	8		3				11	34.4
ulna, proximal	14	16		7	2			23	71.9
pelvis	9	7		2	2			11	34.4
femur, head									
" , proximal	1	2		4	5		4	11	34.4
" , distal	3	2		3	4		4	11	34.4
tibia, proximal	1	6		2	4			10	31.2
" , distal	9	8		4	5			14	43.7

nal peoples. The missing ends need not necessarily have been chewed off by other dogs.

In order to avoid confusion in recording the broken and unbroken elements, if the bone was entire both ends were recorded as separate units. In the worked bone only the cut-off ends were recorded because it was impossible to match the polished bone artifacts with the cut-off ends.

It is of interest here that most of the dogs were fully mature but not old (3 pups and 1 very old dog in a total 32 animals). Most of the skulls and jaws possessed the permanent teeth but these showed little or no wear. On most of the limb bones the epiphysis was securely fused to the shaft and the closure was not of recent date. Aside from avoiding the very old individuals these people do not seem to have exercised much choice in the age of the dogs they presumably used for food.

The frequency distribution of the skeletal elements of dogs from this site is totally different from that of bison, deer, or antelope from any site yet studied. Since the dogs were already in the village no transportation problem would be involved. Consequently, it is to be expected that the frequency distribution of the various skeletal elements would be nearly equal and that it would be possible to predict how the frequency distribution would differ from that of the other food animals. But such is not the case. An examination of Table 10 will show that not only are the differences between dog and other food animals unpredictable but also that the differences between the various skeletal elements of the dog are too great to be explained as accidents of preservation or sampling.

At first it was thought that there were 2 sizes of dogs represented in this sample but when the material was segregated according to element and spread on tables no such grouping was possible. Nor was it possible to make a twofold grouping on the type of limb bone (ratio of length to the 2 diameters). Although careful osteometric studies might reveal 3 or 4 size groups, the difference between the maximum and minimum (25%) is no greater than would be found in any group of mongrel dogs. Also there is the possibility that wolf, coyote, and northern red fox may be included in the sample.

With the mammalogists as well as the paleontologists the term "dog" is used as a group term to include the member of the subfamily *Caninae*, which includes not only the domestic dogs but also wolves, coyotes, foxes, jackals, and a number of other forms, all of which constitute a unified and genetically related group. Consequently, since "dog" is such an inclusive term it must be qualified if used for any special category not mentioned above, such as, aboriginal dog, raccoon dog, etc. As far as this study is concerned the term "dog" is used to include wolves and coyotes as well as aboriginal dogs because aside from skulls and jaws it is impossible to distinguish them.

Skull. A little less than half of the individuals recorded by the maxillae are represented by muzzles or more or less complete skulls. Of these only 2 show any evidence that they were killed by bashing in the parietals. The others show no marks of violence. Possibly they were killed by strangulation. As stated before most of the specimens have the permanent dentition but it shows very little wear. In a number of cases the sutures were sufficiently loosely knit that the skulls fell apart either with cooking or subsequent decay. There are a number of isolated parietals and squamosals but no occipital condyles or basioccipitals. In animals with loosely knit sutures like most of these this element would have been ripped out of the skull by breaking the neck and access to the brain could have been obtained in this manner. Whether breaking the neck was a method of killing or the act was performed later is not indicated by this material. If the above was the case the condyles should have remained with the atlas but no isolated basioccipitals were recovered.

The maxillae represent 62.5% of the greatest number of individuals. Since the dogs would be in the village already and there would be no transportation problem involved a satisfactory explanation for the missing units is not readily apparent.

Mandible. The mandibles represent the greatest number of individuals of any of the elements. Most of them are from mature individuals with the permanent teeth but only 2 specimens show any appreciable wear. Only 33% of the jaws show any breakage and these cannot be demonstrated to be connected with butchering or eating. There is a wide discrepancy between the number of the right and left jaws, particularly among the mature dogs. With the latter the number of left jaws is

nearly twice that of the right. Were the missing elements scattered by the children during play? If so, what was the significance of the right jaw?

Vertebrae. Atlases represent 56% of the individuals, a little less than the number represented by the maxillae. This difference is small enough to be due to the accidents of preservation. This would seem to indicate that the head was removed by severing the neck back of the atlas. If the neck was severed through the axis that element would be smashed beyond recognition. The very low percentages of the other vertebrae suggest that the meat was stripped off the backbone and the remainder discarded.

Forelimb. Since dogs do not possess a clavicle the forelimb could easily be cut loose from the trunk, but without further cutting would be an unwieldy object for the pot. The very low percentage (25) of the proximal ends of humeri suggests that this was a favorite point for subdividing the limb, either by chopping or smashing with a hammerstone. The scapulae, distal ends of humeri, proximal ends of radii, and proximal ends of the ulnae are in rather close agreement. Such discrepancies as these could easily be due to the accidents of preservation. The small percentage (34.4) of the distal ends of radii suggests that normally the forefoot was chopped off above the carpus. In support of this nearly all of the distal ends of the ulnae appear to have been chopped or broken off.

Pelvis and Hind Limb. The percentages of the pelves, femora, and tibiae agree rather closely with each other but are very much below that of the lower jaws or the forelimbs. Except in the very old dogs it would not be too difficult to split a pelvis at the symphysis, break it open, and cut it loose from the sacrum. This would explain the discrepancy between the number of pelves and sacra.

The percentage of femora and tibiae given here includes both the worked and unworked elements. Yet the number is roughly ⅓ that of the lower jaws. Since the hind leg carries the greatest amount of usable meat it is difficult to imagine that it was discarded. Nor do accidents of preservation or sampling seem any more plausible. Also since the quantity of marrow obtainable from the hind legs of one dog would be negligible, the smashing of the bones for bone grease does not seem to fit the case because of the very few ends without the shank. One possibility presents itself though I have seen no ethnographic data to substantiate or refute it. If it be acceptable that the dog feast in general was to honor a special guest or guests and, by our standards at least, the hind leg was a choice cut it may have been the custom for the guests to carry away the bones of the portion they were served as a memento of the courtesy they received.

NUMBER 8: THE DOG BONE FROM THE ROCK VILLAGE SITE

THE DOG BONE which furnishes the basis of this study is from a fortified earth-lodge village (32ME15) situated on the right (south) bank of the Missouri River about 65 miles (air line) northwest of Bismarck, North Dakota. The site was excavated by River Basin Surveys parties under the supervision of G. Ellis Burcaw in 1950 and Donald D. Hartle in 1951. The site is tentatively dated from 1825 to 1837 (Hartle, personal communication).

The sample of dog bone from this site is small enough so that accidents of preservation and discovery will show large discrepancies between right and left elements and the proximal and distal ends of the limb bones. Consequently it is impossible to evaluate the significance of these discrepancies. On the other hand, if the greatest number of individuals represented by any single element (8) is compared with that of the bison (164), in view of the number of houses excavated (13), it is difficult to escape the inference that the dog was a valued animal in this village and was eaten only on very special occasions and dog feasts could not have been more than token feasts. This becomes more evident when the quantity of dog bone from this village is compared with that from Buffalo Pasture (No. 7 of this series) where 3 dwellings and one ceremonial lodge yielded 32 individuals. Of interest here is the fact that none of the tubular bone beads were of dog bone.

Most of the dogs in this sample (see Table 11) are fully mature animals with the permanent dentition but not old (1 pup and 1 dog with well-worn teeth). On most of the limb

bones the epiphyses were securely fused to the shafts and the closures were not of a recent date. Several of the lumbar vertebrae have lost the epiphyses but these appear to all belong to one individual.

Skull. There are 5 entire skulls, 1 represented only by the muzzle, 1 badly broken, and 1 which had parted at the sutures. The complete skulls show no marks of violence, which suggests that the animals were killed by strangulation and that the brain was not used. The unusually good condition of the skulls and the fact that many of the jaws occlude with the skulls suggest that the heads were cut off and either discarded or used for some special part of the ceremony and may not have been cooked.

Mandible. The number of mandibles agrees with the number of skulls and the mandibles are undamaged except for minor breaks from excavation or transportation. There is a discrepancy between the right and left jaws but in such a small sample it is impossible to be certain that this is not due to an accident of preservation or sampling.

Vertebrae. All categories of vertebrae are consistently low in the number of individuals represented. This suggests that the meat was stripped from the column and the vertebrae discarded.

Forelimb. Since dogs do not possess a clavicle, the forelimb could easily be cut loose from the trunk, but without further cutting would be an unwieldy object for the pot. The

TABLE 11. FREQUENCY DISTRIBUTION OF THE DOG BONE FROM THE ROCK VILLAGE SITE.

Element	Mature Rt.	Mature Lt.	Mature Ax.	Indivs. Repres.	Percent of Greatest Number
skull			7	7	87
" , maxilla	8	8		8	100
mandible	4	8		8	100
vertebra, atlas			4	4	50
" , axis			3	3	37
" , cervical			8	2	25
" , dorsal			17	2	25
" , lumbar			9	2	25
" , sacral			2	2	25
" , caudal			4	1	12
scapula	4	4		4	50
humerus, proximal	2	1		2	25
" , distal	8	3		8	100
radius, proximal	3	5		5	62
" , distal	3	4		4	50
ulna, proximal	3	5		5	62
" , distal	1	3		3	37
pelvis	5	4		5	62
femur, proximal	2	2		2	25
" , distal	3			3	37
tibia, proximal	2			2	25
" , distal	5	2		5	62
astragalus	3	2		3	37
calcaneum	4			4	50

low number of scapulae could be due to an accident of preservation or sampling. The very low number of proximal ends of the humeri suggests that the limb may have been subdivided by smashing the upper end with a hammerstone. There is a wide discrepancy between the numbers of distal ends of humeri, proximal ends of radii, and proximal ends of ulnae. In such a small sample this could easily be due to the accidents of preservation or sampling.

Pelvis and Hind Limb. The pelves, distal ends of femora, and distal ends of tibiae are in sufficient agreement that the discrepancies could easily be due to accidents of preservation. An entire hind leg would be an unwieldy object for the pot without further cutting. The very low number of proximal ends of femora and proximal ends of tibiae suggests that the knee and the hip joint were the usual places for subdividing the hind leg.

The elements of the carpus and tarsus were very scarce in this sample but they are rather small bones and could easily have been lost. There were 27 metapodials in this sample and the great majority of these were metatarsals which suggests that the front feet were cut off and discarded.

NUMBER 9: THE BISON AND ELK BONE FROM THE NIGHTWALKER'S BUTTE IN THE BULL PASTURE SITE

THE BISON and elk bone which provides the basis of this study is from a fortified earth-lodge village (32ML39) in the Garrison Reservoir area about 5 miles southeast of Elbowoods, McLean County, North Dakota. The site was excavated by a River Basin Surveys party under the supervision of Donald D. Hartle. This site is of particular interest because it is situated on top of a butte which rises 200 feet above the surrounding terrain and all food, fuel, and water must by necessity have been carried to the top of the butte. Also any agriculture which was practiced must by necessity have been located in the valley. As well as providing greater safety from roving bands of other peoples such a location would have been much freer of mosquitoes and flies during the summer as well as much cooler than locations in the valley. It seems reasonable to expect much of the processing of the meat would have been done in the valley where poles for drying racks and fuel were most accessible. Yet a considerable quantity of bone was carried to the top of the butte. The pattern of the frequency distribution of the various elements is somewhat different from the other sites studied but the differences are not such as would indicate that the location on top of the butte was the principal determining factor.

On the other hand if the meat was processed at the base of the butte, a guard at night would have been necessary to protect it from roving bands of other peoples and foraging animals. However, the above consideration is not necessarily applicable to agricultural implements or bullboat paddles which could easily and safely have been concealed in the underbrush in the valley and need not have been carried to the top of the butte each evening.

Skull. With both the bison (Table 12) and elk (Table 13) the occipital portion of the skull is conspicuous by its complete absence. There are 2 possibilities to explain this: either the brain was removed at the kill and the occipital portion of the skull discarded or if the head was brought in the brain was removed by smashing the condyles and basicranium. Only 4 horn cores of bison were recovered and none of them had been worked. There were a few fragments of elk antler among the worked bone but since the rights and lefts could not be determined a count was not attempted. The percentage of maxillae is high for both bison (43.4)and elk (30) which suggests that the nasal cartilages were extensively used for soup but the rest of the skull was generally discarded.

Lower Jaw. With the bison lower jaws represent the greatest number of any of the elements but with the elk lower jaws represent only 24% of the individuals. In the other studies of this sort which have been made the number of bison lower jaws was very close to the maximum number of individuals represented and it was assumed that they were brought in with the tongue. But in this case why the very great discrepancy between the elk and bison? Are we to assume that elk tongue was less desirable than bison? After the jaws had been separated

from the skull it would have been relatively easy to remove the tongue even with a stone knife so why carry the jaws to the top of the butte?

Hyoid. Hyoids represent only 9% of the bison and none of the elk. On the other hand the hyoid is a small and fragile bone and could be easily lost or destroyed. Consequently no significance can be attached to this discrepancy.

Vertebrae. This site is unique among those studied so far in the rather high percentage (14.5) of bison atlases and the complete absence of occipital portions. The percentage (9) of axes is somewhat lower but both are much higher than any other segment of the vertebral column. The remaining segments of the vertebral column are conspicuous by their extremely low representation which when considered with the rather high percentage for the atlas and the absence of the occipital portion of the skull makes this site unique among those studied. The limited ethnological data which supports these studies indicates that the vertebral column was normally stripped of the axial muscles and left at the place of butchering. It is to be expected that fewer of the vertebrae would be carried to the top of the butte but why the higher percentage for the atlas and axis?

TABLE 12. FREQUENCY DISTRIBUTION OF THE BISON BONE FROM NIGHTWALKER'S BUTTE IN THE BULL PASTURE.

Element	Mature Rt.	Mature Lt.	Mature Ax.	Worked Rt.	Worked Lt.	Worked Ax.	Indivs. Repres.	Percent of greatest number
skull, horn cores	4	4					4	7.3
" , maxilla	23	24					24	43.7
mandible	55	52					55	100.0
hyoid	5	4					5	9.0
vertebrae, atlas			8				8	14.5
" , axis			5				5	9.0
" , cervical			10				2	3.7
" , dorsal			15				2	3.7
" , lumbar			1				1	
scapula	29	30		9	8		38	70.0
humerus, proximal	8	3		6	8		16	30.0
" , distal	17	22					22	40.0
radius, proximal	12	15					15	27.7
" , distal	8	9					9	17.0
ulna, proximal	10	12					12	21.0
metacarpal	11	5					11	20.0
pelvis	10	5					10	19.0
femur, head	5	3		1	1		6	10.0
" , proximal	1						1	
" , distal	9	4					9	17.0
tibia, proximal		2					2	3.7
" , distal	30	25					30	54.5
astragalus	4	6					6	10.0
metatarsal	1	1			1		2	3.7

Large quantities of unworked ribs were found in this site but no count was made. It would appear that these people, as with many people today, enjoyed barbecued or boiled spareribs.

Forelimb. The percentages of scapulae of elk and bison are sufficiently close together that the difference can be accounted for by accident of preservation or sampling. There is a somewhat greater percentage of worked scapulae of bison than of elk. It is possible that for primitive agriculture the heavier scapula is the more desirable. Also the low count of the worked scapulae of bison may be due to the fact that the agricultural implements were left at the fields at the close of the season or possibly transported to the winter village and left there.

There is a rather wide discrepancy in the percentage of proximal ends of humeri between the bison (30) and elk (15). However, this is largely due to the number of hide burnishers made from the head of the bison humerus. The percentages of the distal ends of humeri are in much closer agreement (40 for bison and 47 for elk) but both are much below the greatest number of individuals represented. Since the humerus has a rather high marrow content the missing elements were presumably smashed beyond recognition in the preparation of bone grease.

The percentages of radii and ulnae are considerably below that of distal ends of humeri. Since these elements do not carry much usable meat and have a rather low marrow content they presumably might have been discarded when game was plentiful.

With the bison the percentage of the metacarpals (20) is in harmony with that of the radii and ulnae and is very much above that of the metatarsals. Possibly these elements were brought in for the manufacture of glue. With

TABLE 13. FREQUENCY DISTRIBUTION OF THE ELK BONE FROM NIGHTWALKER'S BUTTE IN THE BULL PASTURE.

Element	Mature Rt.	Mature Lt.	Mature Ax.	Worked Rt.	Worked Lt.	Worked Ax.	Indivs. Repres.	Percent of greatest number
skull, maxilla	4	4					4	30.0
mandible	2	3					3	24.0
vertebra, dorsal			1				1	7.0
scapula	7	5		1			8	61.5
humerus, proximal	2						2	15.0
" , distal	6	1					6	47.0
radius, proximal	4	2					4	30.0
" , distal		1					1	7.0
ulna, proximal	2	1					2	15.0
metacarpal	2	6					6	47.0
femur, proximal		2					2	15.0
" , distal	1	2					2	15.0
tibia, proximal	1	1					1	7.0
" , distal	2	3					3	24.0
astragalus	8	6		1			9	77.0
calcaneum	7	2					7	54.0
cuboid	8	5					8	61.5
metatarsal	11	5		2	1		13	100.0

the elk the percentage (47) of the metacarpals agrees with the distal ends of the humeri and greatly exceeds that of the radii and ulnae. Since the sample of elk is so small it is difficult to be certain that this difference has any significance. It seems more reasonable to assume that this is due to the accidents of preservation and discovery rather than that these people chopped out the middle section of the foreleg and brought in only the humerus and metacarpal.

Pelvis and Hind Limb. Nineteen percent of the bison and none of the elk are represented by pelves. Since it is relatively easy to strip the usable meat from the pelvis and its marrow content is practically nil, it was presumably left at the kill. Of interest here is the fact that this site yielded a greater percentage of pelves than any other site studied except the Monroe and Anderson foci (No. 6 of this series) of the Dodd Site (39ST30). The Monroe and Anderson foci are believed to date A.D. 1500 (Lehmer 1954), and this site is believed to date around the beginning of the 19th century (Robert L. Stephenson, personal communication).

The percentages of the proximal and distal ends of femora and the proximal ends of tibiae are consistently low for both bison and elk. These bones have a high marrow content and presumably were smashed beyond recognition in the preparation of bone grease.

The very low percentages of the distal ends of tibiae of both bison (54.5) and elk (24) is a feature of this site which is encountered elsewhere only among those peoples who practiced agriculture extensively (No. 4 of this series). In the case of the bison, with the extremely low percentage of the metatarsals (3.7), the inference to be drawn is that the distal ends of tibiae were cut off and discarded with the metatarsals. In the case of the elk, the greatest number of individuals is presented by metatarsals and with the tarsal elements more or less in harmony invites the inference that the entire hind leg of the elk was carried to the top of the butte. The missing distal ends of the tibiae then are due to the accidents of preservation and sampling.

LEHMER, D. J.

1954 Archeological Investigations in the Oahe Dam Area, South Dakota, 1950-51. *River Basin Survey Papers, No. 7. Bureau of American Ethnology, Bulletin* 158. Washington.

DINOSAUR NATIONAL MONUMENT
Vernal, Utah
August, 1954

CORRECTION

An error in Paul H. Ezell's article, "The Archaeological Delineation of a Cultural Boundary in Papaguería" (Vol. 20, No. 4, April, 1955), has been brought to the author's attention by Albert H. Schroeder. Ezell has asked the following correction to be made: On page 372, first column, the paragraph beginning "Next below the Ozaras Argüello listed the *Alebdoma* (Halchidoma)." should read "Next below the Ozaras Escobar listed the *Alebdoma* (Halchidoma). Argüello's statement that. . . ."

FACTS AND COMMENTS

EXCAVATIONS AT POTTERY MOUND, NEW MEXICO

The first season's excavations of the University of New Mexico at the site called Pottery Mound, near Los Lunas, New Mexico, have revealed a painted kiva with interesting differences when compared with those heretofore discovered. The excavations were carried on as part of the 1954 Archaeological Field Session of the University of New Mexico. Work was continued at the site for a period of 6 weeks. It is contemplated that excavations will be resumed in the season of 1955.

Pottery Mound is a large site covering approximately 2 acres. It has been known for the last 2 decades to archaeologists and laymen alike as a place prolific in many kinds of pottery. It is this circumstance which has given the place its name.

Excavations of the 1954 season were carried on in the northeast portion of the mound. Also a very extensive refuse pile on the south periphery of the site was trenched for stratigraphical purposes.

These preliminary excavations revealed that the site consists of 3 superimposed levels with the possibility of a fourth and earlier level at the base of this sequence. Walls are of puddled adobe and of the usual Pueblo IV type of construction. The 3 general Pueblo structures revealed on the northeastern section of the mound apparently date from Glaze I times through the Middle Glaze period. The presence of Socorro Black on White sherds of Pueblo III date in the lowermost levels of the refuse piles gives promise of finding an earlier structure of Pueblo III date at the very base of the mound. Pueblo III architecture, however, has not as yet been revealed.

The history of Pottery Mound as revealed by the architecture and the pottery indicates an occupation of considerable extent followed by the destruction of an early Glaze-period structure by burning. Another pueblo was subsequently built on the ruins of the first apparently with little time lapse between them. This second structure, also of earlier Glaze date, was partially destroyed and partially abandoned. The third or last Pueblo was built directly over the preceding second. Many walls and floors of the uppermost structure incorporated portions of the earlier ones in their makeup.

Not the least remarkable aspect of the Pottery Mound Site is the plethora of pottery types revealed. Rio Grande glazes and Zuni glazes predominate. There are also, however, frequent western types such as St. Johns Polychrome, Jeddito Brown on Yellow, and Sitkyatki Polychrome. The latter 2 wares, as they constitute a considerable percentage of the sherds from Pottery Mound, present a strong possibility of an intrusion from the west of a large group of Hopi peoples.

The painted kiva excavated during the 1954 season was almost square in plan and 14 feet in each dimension. It was located on the northeast portion of the site in connection with the earliest Glaze I pueblo. The kiva had apparently been purposely abandoned and its

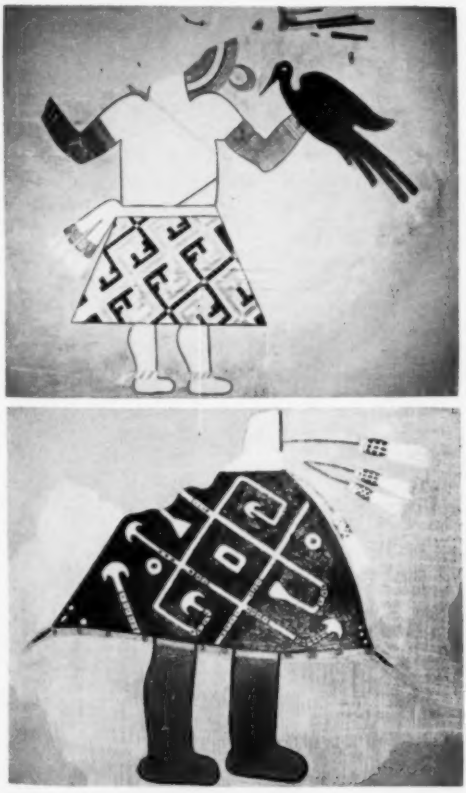

FIG. 58. Dancing figures, east and west walls of painted kiva, Pottery Mound, New Mexico.

FIG. 59. Figure from east wall of painted kiva, Pottery Mound.

painted walls covered over with a plain layer of adobe paint. Subsequently the kiva had been filled with trash of Early and Middle Glaze consistency.

All walls of the kiva are plastered in multiple layers. Some 20 layers of plaster are discernible in a cross section. Six of these layers are painted. The east, west, and south walls are decorated with dancing and masked figures. Unfortunately, erosion of the top of the wall has destroyed the heads and in some cases the upper portions of the bodies of these dancing figures (Figs. 58, 59). The lower parts of the figures, however, show most interesting details in the designs of the skirts and feather-decorated staffs carried by the dancers. Skirts are tasseled and show very intricate textile patterns. The colors represented in the dancing figures are white, black, yellow, maroon red, orange, and brick red.

The north wall of the painted kiva had broken off at its base and fallen forward into the kiva with the painted portion beneath. There was evidence that this wall had been purposely cut off at the base and pushed over. The broken portions of the north wall were jacketed in molding plaster and removed intact to the laboratory. Here the jackets were removed and the pieces fitted together.

The design of the first painted layer shows 4 insect figures with human attributes (Fig. 60). These figures are climbing the stalks of flowering plants. The 4 figures emerge from a gray ground line beneath and are climbing toward a band of cloud forms above. This painting is rendered in black, white gray, yellow, maroon red, and a coral pink.

Subsequently, in the laboratory the first layer of the painted plaster was removed from the north wall to reveal a second one beneath. This second layer shows a panel design of extreme complexity (Fig. 61). Features of the design are reminiscent of those painted on Sitkyatki pottery. This second layer motif is painted in black, white, brick red, and gray blue.

FIG. 61. North wall, second painted layer.

Those walls still standing in the painted kiva were covered over to protect them from moisture and left in the field. Additional work on the north wall is progressing in the laboratory at the present time.

Subsequently to the closing of the 1954 excavations 3 additional painted kivas were located underneath room tiers of the later structures. These additional kivas will be excavated during the 1955 season.

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April, 1955

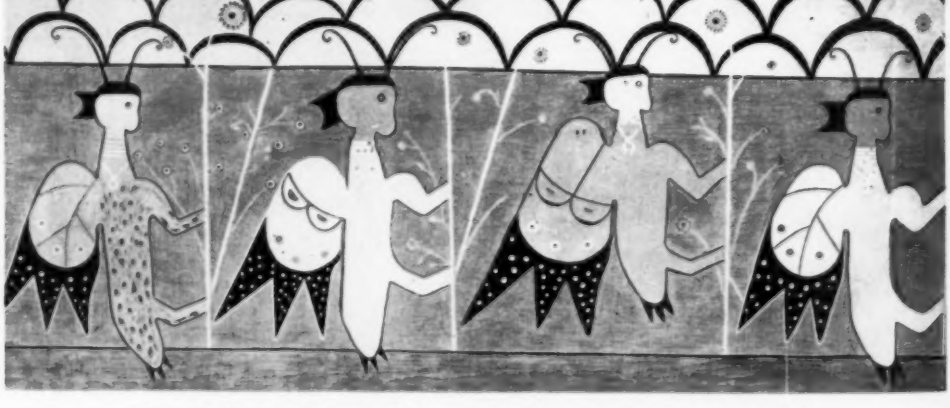

FIG. 60. North wall of painted kiva at Pottery Mound. Portions of first, second, and fourth figures have been restored.

ADDITIONAL DATA ON FIRED CLAY HUMAN FIGURINES FROM CALIFORNIA

Since the analysis by R. F. Heizer and R. K. Beardsley (1943) of 7 fired clay figurines from 3 localities in California, archaeological investigations in the central and northern areas of the state have produced more knowledge of the types and occurrence of this form.

The 25 figurines discussed here include 3 from site 4-Son-299, 4 from site 4-Mrn-168, sites excavated by the University of California Archaeological Survey, and 18 from Gunther Island, site 4-Hum-67, of which 10 are in the private collection of H. H. Stuart of Eureka, California, and the remainder in the State Indian Museum at Sacramento.

The specimens here reported on, which represent more than 3 times the number available for analysis in 1943, provide additional data on design motifs and distribution, and in addition possess much more clearly definable cultural associations than do the original 7 specimens.

The first group of figurines, those from Marin County, were recovered during the salvage excavation of a shellmidden site at Ignacio, near San Rafael, California. This site, which is typical of the San Francisco Bay area shellmounds, appears to be typologically equatable with the Coastal Province Middle Horizon McClure facies as defined by Beardsley (1954). The Middle Horizon culture is believed to have begun to assume distinctive form and distribution about 4000 years ago and was succeeded by the Late Horizon about 1500 years ago.

The 4-Son-299 site, also a typical California shellmound, is located on the inner shore of Bodega Bay. This site seems to be equatable with the same Middle Horizon facies as does 4-Mrn-168.

The Gunther Island site (4-Hum-67) is a shellmound on an island in Humboldt Bay. The cultural material from this site is similar to that of the present day Wiyot, with a few notable exceptions, which include "slave killers" (zoöform clubs), biconical clay objects, and the clay human figurines themselves. The general similarity between the Gunther Island and Wiyot cultures seems to indicate that essentially the same culture pattern has existed in the area for 1000 years or more. Some of the figurines were associated as offerings with burials.

Group I: Marin County

UCMA 1-153163.* Complete female figurine. Site 4-Mrn-168. Greatest length 60.5 mm.; greatest width 21.0 mm.; average thickness 11.8 mm. Color: light brown. Appliqué breasts extend laterally from body. Clay fine textured, without fiber temper. Decoration consists of 3 pairs of punctated vertical lines; the central pair straight, the other 2 pairs zigzag. The figurine is substantially complete, and base and apex show signs of wear (Fig. 62 *f*).

* The number designations are as follows: UCMA, University of California Museum of Anthropology; SIM, State Indian Museum, Sacramento; S, Stuart Collection, Eureka.

UCMA 1-154197. Incomplete figurine, sex indeterminate. Site 4-Mrn-168. Greatest length 74.0 mm.; greatest width 21.5 mm.; average thickness 13.0 mm. Color: dark brown. Clay is rough and coarse and incompletely fired. No sex indicators. Decorated with 9 pairs of broken horizontal lines divided at center by a vertical line which extends to single deep punctation near base (Fig. 62 *b*).

UCMA 1-153164. Incomplete figurine, sex indeterminate. Site 4-Mrn-168. Greatest length 44.0 mm.; greatest width 18.5 mm.; average thickness 8.0 mm. Color: yellowish red. Clay fine textured; no fiber temper. Only basal section of figure remains, and no sex identification is possible. Base is wedge shaped. Decoration consists of 4 punctated vertical zigzag lines, 3 of which terminate at outer of 2 concentric circles near base (Fig. 63 *h*).

UCMA 1-153165. Incomplete figurine. Site 4-Mrn-168. This specimen is so fragmentary that measurements are of no value. The only decoration consists of a single incised chevron (not illustrated).

Group II: Sonoma County

UCMA 1-109501. Complete figurine, sex indeterminate. Site 4-Son-299. Greatest length 65.0 mm.; greatest width 51.0 mm.; average thickness 12.5 mm. Color: red brown. Clay rough and very micaceous; no sex indicators. Decoration consists of 2 wide incised bands across lower portion of figure, in center of which lies a single deep punctation. Also a single punctation on each side of body near top, perhaps to indicate arms (Fig. 63 *e*).

UCMA 1-114484. Incomplete female figurine. Site 4-Son-299. Greatest length 49.0 mm.; greatest width 32.5 mm.; average thickness 9.5 mm. Color: brick red. Clay gritty and micaceous, with pitted surface, perhaps due to burnt out fiber temper. Breasts represented by small nodal swellings. No decoration. Upper end of figure appears to have been spatulate in shape.

UCMA 1-109914. Incomplete female figurine. Site 4-Mrn-299. Greatest length 47.0 mm.; greatest width 51.0 mm.; average thickness 22.0 mm. Color: brick red. Clay coarse and micaceous. Breasts represented by small swellings near center of figure. Upper and lower end damaged; fragment seems to be pectoral area. Decoration consists of 3 vertical punctated lines, one of which runs between breasts, while other 2 begin at breasts and extend down body (Fig. 63 *g*).

Group III: Humboldt County

SIM WSW 338-7. Complete female figurine. Site 4-Hum-67. Greatest length 127.0 mm.; greatest width 36.0 mm.; average thickness 14.0 mm. Breasts represented by small appliqué swellings at edge of body. Decoration consists of pair of punctated parallel horizontal lines at upper edge of body, group of punctations at center of body below this, and a pair of parallel lines slanting from each side of body to a point between breasts and then running vertically downward. From each of the latter pairs of lines a group of short lines extends at right angles (Fig. 62 *d*).

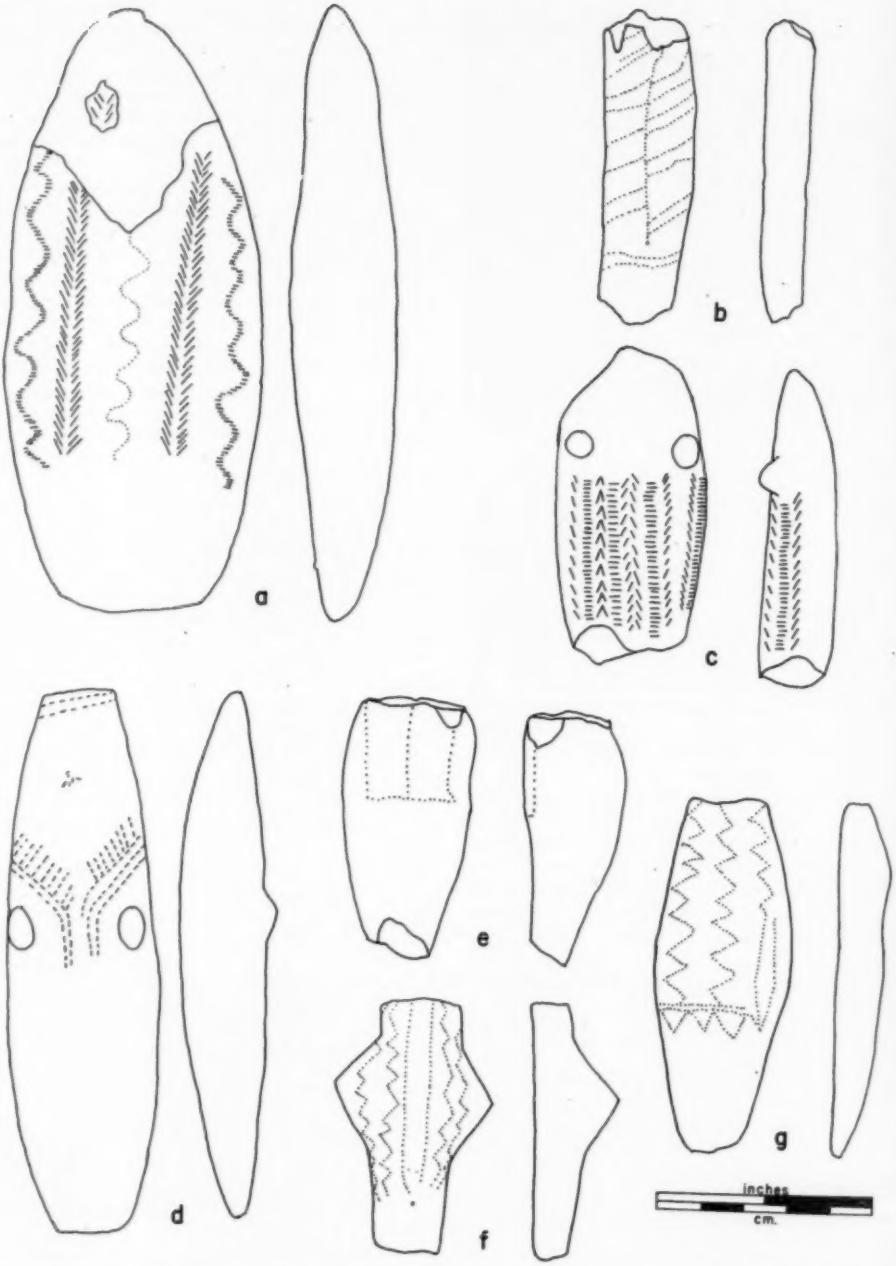

FIG. 62. Front and profile outlines of figurines. For full explanation see text. *a*, S No. 2; *b*, UCMA No. 1-154197; *c*, S No. 5; *d*, SIM No. WSW 338-7; *e*, S No. 6; *f*, UCMA No. 1-153163; *g*, S No. 9.

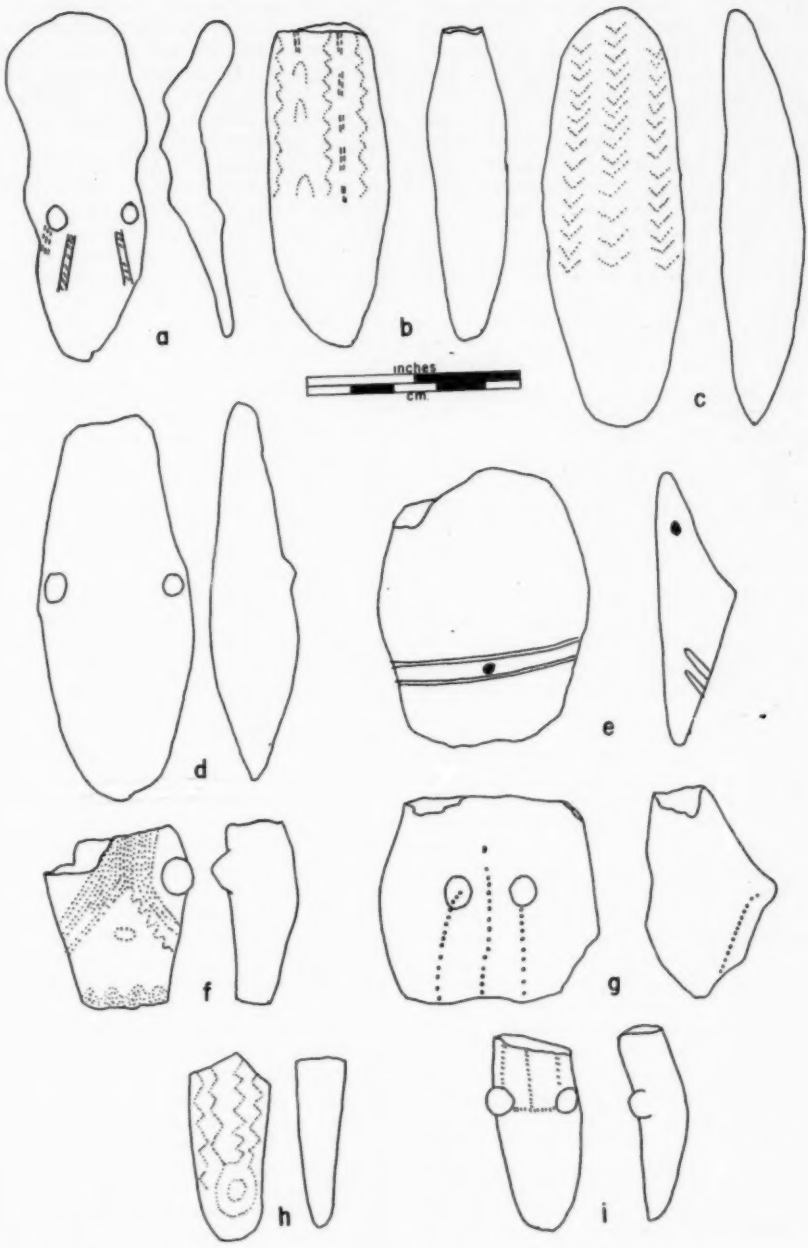

FIG. 63. Front and profile outlines of California clay figurines. See text for full explanation. *a*, SIM, no catalog no.; *b*, S No. 10; *c*, S No. 1; *d*, SIM No. WSW 339-7; *e*, UCMA No. 1-109501; *f*, S No. 8; *g*, UCMA No. 1-109914; *h*, UCMA No. 1-153164; *i*, S No. 7.

SIM WSW 339-7. Complete female figurine. Site 4-Hum-67. Greatest length 91.0 mm.; greatest width 36.5 mm.; average thickness 13.5 mm. Breasts represented by small nodal swellings. No decoration. Body slightly constricted near upper end, but does not appear to represent a head (Fig. 63 *d*).

SIM (no catalogue no.). Complete female figurine Site 4-Hum-67. Greatest length 80.5 mm.; greatest width 30.0 mm.; average thickness 7.0 mm. Breasts represented by small appliqué swellings on lower portion of body. Decoration consists of a group of 3 punctated vertical lines, and 2 pairs of incised vertical lines, each of which encloses a group of slanting horizontal lines. The upper portion of this figure is badly eroded (Fig. 62 *a*).

S 1. Complete figurine, sex indeterminate. Site 4-Hum-67. Greatest length 97.0 mm.; greatest width 33.0 mm.; average thickness 13.0 mm. Color: dark gray. Clay smooth textured; no sex indicators. Decoration consists of 3 vertical rows of punctated chevrons with apices toward base of figure (Fig. 63 *c*).

S 2. Complete figurine, sex indeterminate. Site 4-Hum-67. (Three specimens, SIM WSW 348-7, SIM G471 and SIM G479 are merely smooth ovoids of clay, with no sex indicators. Only one of these has any decoration, and it shows no pattern.) Greatest length 145.0 mm.; greatest width 59.5 mm.; average thickness 18.5 mm. Color: dark gray. Clay sandy; no sex indicators. Decoration consists of 3 vertical zigzag lines, one at the center and one at each edge of the figure. Between these lie vertical lines of incised chevrons. Upper third of figure badly eroded, but specimen otherwise intact (Fig. 62 *a*).

S 5. Incomplete female figurine. Site 4-Hum-67. Greatest length 76.0 mm.; greatest width 35.0 mm.; average thickness 11.0 mm. Color: black exterior, red interior. Sandy clay; breasts modeled from clay of figure. Decoration consists of 4 vertical rows of short incised horizontal lines; between these rows lie vertical rows of incised chevrons with apices toward upper end of figure. Single vertical row of lines representing half of chevron motif lies at each edge of body. Base is missing, but upper end intact, showing small projection probably representing head (Fig. 62 *c*).

S 7. Incomplete female figurine. Site 4-Hum-67. Greatest length 43.0 mm.; greatest width 20.0 mm.; average thickness 9.0 mm. Color: brick red. Breasts present; decoration consists of punctated rectangle extending from broken upper end to breasts and bisected by vertical line. Punctations are extremely large. Base is wedge shaped (Fig. 63 *i*).

S 8. Incomplete female figurine. Site 4-Hum-67. Greatest length 41.0 mm.; greatest width 34.5 mm.; average thickness 12.0 mm. Color: gray. Single remaining breast molded from clay of body. Group of punctated lines run from broken upper end of body. Also circle of punctations at center of body below breasts, and horizontal zigzag belt of punctations at broken lower edge (Fig. 63 *f*).

S 9. Incomplete female (?) figurine. Site 4-Hum-67. Greatest length 81.0 mm.; greatest width 31.0 mm.; average thickness 9.0 mm. Color: gray. No breasts modeled, but constriction near upper end may indicate female sex. Three zigzag lines run vertically down body; right hand line discontinues zigzag and runs straight vertically in lower portion of body, parallel to another line. All lines terminate at horizontal line near base. Base is wedge shaped (Fig. 62 *g*).

S 10. Incomplete figurine, sex indeterminate. Site 4-Hum-67. Greatest length 72.0 mm.; greatest width 28.0 mm.; average thickness 14.0 mm. Color: gray. No sex indicators. Decoration consists of 3 punctated vertical zigzag lines extending from broken upper end to point above base. Between center and left lines lie 2 short parallel vertical lines and 3 horseshoe-shaped patterns. Between center and right lines lie 5 pairs of short vertical lines. Base is blunt and rounded (Fig. 63 *b*).

Form and Design Elements. Of the figurines described above, 10 are definitely female, 6, though complete, show no sex indicators, and 9 are damaged to such an extent that definition of sex is impossible. In the female figures, sex is indicated by breasts, usually appliquéd. Body form varies greatly, ranging from ovoid to columnar and from short and thick to tall and relatively thin. The wedge shaped base predominates, with a few specimens having rounded, blunt bases.

Decoration on almost all specimens is formed of punctations or small incisions, and on only 3 specimens do incised lines of any length appear. The predominant motif is the zigzag or wavy line, generally extending vertically along the front of the body; other recurrent elements include the chevron and the straight vertical line. Figurines not displaying these elements exhibit a variety of complex designs. Decoration seems to be wholly of geometric elements, and there is no attempt at the schematized representation of clothing, noted by Heizer and Beardsley (1943) for specimens from Shasta County.

Twelve years ago the decision as to whether or not the California fired clay human figurines were historically connected with those of the Anasazi or Hohokam areas did not seem possible (Heizer and Beardsley 1943). The present authors must also admit their inability to reach a decision upon this point. Morss (1954:45) believes that some Basketmaker III figurines (specifically those described by Morris from Prayer Rock) and some of the California specimens "seem . . . closer than can be explained by 'psychic unity' alone." Of course Morss is correct, and his position is supported by the general fact that we have a local emphasis on figurines in California which is after all an area not far removed from the Southwest in space. Reason and probability all favor the conclusion that historical connection of this art exists between these 2 areas, but since objective archaeological evidence of similar figurines in the intervening area (south Central and Southern California) is not at hand we must admit the problem is still unsolved. D. L. True is at present studying Southern California figurines and his analysis will appear in a forthcoming issue of this journal. Some unusual painted sandstone tablets from the Napa region of Central

California may represent babe-in-cradle figurines (Meighan and others 1953: 257, 283, 285; Figs. 2-3; Morss 1954).

There is a considerable body of evidence indicating that California has received cultural influences from the Puebloan Southwest. This evidence which is detailed in Heizer (1946) and by various authors in Volume 56, Number 4 (August, 1954) of the *American Anthropologist* can really only be interpreted as due to cultural diffusion from the Puebloan region which has reached Central California in still specific, recognizable form. It is possible that the custom of making clay figurines might be included in this aggregate of diffused features, although the Humboldt Bay region, where figurines are common (site 4-Hum-67), seems to be beyond the reach of such influences. Speculation is unproductive on this matter and the answer to the problem of the source of the impulse for certain prehistoric Central California peoples to make figurines still lies in the future which, we trust, will see more evidence accumulated.

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December, 1954

PINTO BASIN POINTS IN UTAH

A little-known territory is the Four Corners area, where the states of Utah, Arizona, New Mexico, and Colorado join. There are few roads in this area, and it is inhabited chiefly by Navaho Indians, still living in primitive conditions. It was while I was living in this region — maintaining a small school, a very active clinic, a chapel, and a sort of hostel for travelers passing through on horse or in wagon from trading posts or going from one hogan to another — that certain artifacts came to light.

The first points submitted for classification to H. Marie Wormington, of the Denver Museum, included Yuma, Silver Lake, and Pinto Basin types, among others. During the 1951-53 period, a large number of points were sent to Dr. Wormington. Many were points I picked up, but a good percentage came as the result of training Navaho shepherds and certain of my pupils to recognize the Pinto Basin types. During this 2-year period, a total of nearly 60 such points were identified. Most of them were sent to Dr. Wormington, a few were given to the University of Utah, and others have been presented to Mesa Verde National Park. I have in my own possession, still, 3 such points, discovered just before I left Utah in July, 1953. Several Navaho families have such points and tentative identification of Pinto-type points was made in the flickering light of a hogan fire during attendance at certain Navaho ceremonies. Recently, I was informed of a trader who has 19 points, and the same informant stated that a National Park Service worker has 6 Pinto points picked up in the same area.

Such concentration of the Pinto Basin points is striking, especially as this type was unknown in this area previous to the first identification by Dr. Wormington. It leads to certain speculation, as well as the hope that further investigation of this area can be made.

The San Juan River flows through the Four Corners country. At one point, the Montezuma Creek wash drains into the river. This wash used to run most of the year, and many Navaho still remember irrigating now abandoned farms from the wash. Now, however, except for spring thaws or cloudbursts, the wash is dry almost all year round. Most of the Pinto Basin points found in Utah were picked up around Montezuma Wash. All were surface finds. However, one was picked up at a possible campsite, and one boy reported the point he brought in was found in a rock shelter. I left Utah before I had a chance to investigate the sites. Further, because my duties were time consuming, because travel conditions in the area are what they are, because of the sandstorms and the extreme heat during much of the year, it was not possible to do much investigation of the area. However, areas where the herder picked up points were noted for "future exploration." The shepherds graze their flocks in rather localized areas, which is one reason so much of that country is yet unexplored as far as Pinto points are concerned. As I lived on the north side of the river, most of my contacts were with the Navaho travelling in that area. However, one boy brought a Pinto point from across the river, and another visitor from the south side of the river showed me a type point that he carried as an amulet.

Speaking very generally, the greatest concentration of Pinto-type points was along the Montezuma Creek wash. Because a particular herder spent most of his days on the east side of the wash, most of his finds were from that area. However, many were found on the west side, also. Pinto points were found along the wash for several miles. The trader mentioned earlier has a post along the wash about 8 or 10 miles above the San Juan River, and his clients live throughout the whole area. One medicine man brought in the first Pinto point of this area, found about halfway up the wash. The National Park Service worker covers an area above all this.

My own finds were in various locations between Bluff and the western bank of Montezuma Creek. The first were picked up on the cliffs above Bluff, land now chiefly drifting sand and slick rock; several were picked up on a horse trail leading along the river from Bluff to Recapture Wash; 2 were picked up beyond Recapture, near a landmark known as Tse Echi; 2 on a trail along the river; 1 on the horse trail going down toward McCracken Wash; several on the mesas in that area, and along tributaries of the larger washes; and so on. In other words, the finds would indicate movement along the San Juan River.

It should be pointed out, also, that the only way to follow the "routes" suggested by the location of the points discovered would be by horse or afoot. It is impossible to drive any vehicle along the trails. It is rugged country, with great canyons. It is impossible to describe it to those who do not know it. One must know the springs — both of them — before trying to explore. Thermometers have registered 130° in the sun, during the morning!

Another important fact should be noted. These Pinto points were all above the river. Except for 2 on intermediate levels all finds were made along the cliff and mesa tops. This would suggest that the water level was high, very high, during the time the Pinto point user was in the area. One can find many Basketmaker and Pueblo artifacts much lower, and this area is very rich in this material. But the Pinto-type points have been found on mesa tops, hundreds of feet above the present river level. The exceptions to the very high locations were still well above the present river level. One was in a canyon after a storm, and as it was not along the trail the day before it seems possible that the storm washed it down. This canyon is still high above the present riverbed. Another point was found in a site that has much Basketmaker and Pueblo material (and has been seen by Jack Rudy).

This mixture of complexes appeared another time. In the above instance, where travel is impossible except by the one narrow trail, it is possible that people have always used it. The Navaho still use it for foot or horse travel. Navaho so passing drop brooches, pins, cigarettes; a Pinto man could very well have dropped his point, to have it washed out in later years. The other admixture of complexes was with Developmental Pueblo beads and arrowheads (so classified by Dr. Wormington). But the site was obviously a much-used campsite, and, I suspect, its use started much earlier than Developmental Pueblo periods. I hope to return to the area someday and explore the site. It is impossible to describe its location: one can only go there. It is a good hike through sand, across washes, up to the top of a mesa, all some distance from the nearest road.

It would seem, then, that Pinto man followed the course of the San Juan River and went up Montezuma Creek wash. Further exploration of the area would be fruitful. This should be soon; otherwise searchers will have to start from scratch, with only the certainty that somewhere in the area Pinto points have been discovered to go on.

Dr. Wormington visited Bluff in 1952. While she was there a Navaho woman brought in some points and arrowheads. Several Pinto points were obtained and sent to Denver. This woman lives west of Bluff, on the south side of the river, near Gypsum or Chinlee Wash.

This leads to further consideration of the route followed by the Pinto man. Collections of amateur archaeologists examined in the last year have disclosed that the general locations of Pinto finds have been around Del Norte and Durango, Colorado; around Concho and Show Low, Arizona; the last point sent to Dr. Wormington was turned in by people of the remote Black Mountain area, beyond Chinlee, Arizona; Rudy has mentioned that several points were found in the Hopi area; and others have been made in Utah and Colorado, by both professional and amateur archaeologists. Don Watson, of Mesa Verde, found an early, yet unclassified, point near Aneth, Utah, in 1953. Pinto and Pinto-like points have been seen recently by the author in a collection from the Carson's Post area, along the Gallegos Wash, near Farmington, New Mexico.

On the basis of these finds, it might be possible to work out a route taken by the Pinto-point makers, starting at the original site in California, and working toward the Colorado River, following this, and then branching off along the Little Colorado and the San Juan rivers. Careful exploration might bring to light further Pinto material. Before dropping this thought, the finds in Black Mountain and in the Hopi area are not far from drainages into these rivers, and some explorations along the washes indicated might prove fruitful, also, if continued in the high country.

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September, 1954

REVIEWS

Edited by Raymond H. Thompson

The Botany of Cook's Voyages. Elmer Drew Merrill. Chronica Botanica, Waltham, 1954. 228 pp. $4.75.

There is much of interest to anthropologists in this book — much more than its title would indicate — for it brings to bear an impressive array of solid facts on the problem of trans-Pacific diffusion, a problem whose main features have been almost lost in recent years in a miasma of unrestrained, often uninformed, speculation.

Merrill is one of the world's leading authorities on the vegetation of Asia and the Pacific islands and on the literature pertaining to it. For some years past he has been making a first-hand study of the plants collected by botanists and others on Captain Cook's 3 voyages, and by Roxburgh, the "father" of Indian botany. These studies proved to have unexpected significance for anthropology, biogeography, and history. These early collections of plant specimens with the collectors' data on locality and date represent to trained botanists evidence as tangible and valid as the potsherds, projectile points, and other artifacts upon which archaeologists base their conclusions. As Merrill himself says: "Evidence of this kind is decisive and fatal to dreamy and unsupported ideas as to when and by whom given exotic species (various cultivated economic ones and weeds) were introduced into insular areas."

The botanical evidence from Cook's voyages and other early sources as analyzed by this experienced botanist who, in contrast to some of his contemporaries, not only knows plants but is quite at home in the Latin in which the early collections were usually described, provides little comfort to the proponents of pre-Columbian trans-Pacific diffusion. Specifically, of the 260 species collected in 1769 by Banks and Solander in Tahiti, the center of the Polynesian culture area, and later described by Solander, about 197 are manifestly indigenous. A few others may have been introduced by natural means before the advent of man. Of the remainder, about 30 are purposely introduced food and other economic plants, all of which, except the sweet potato, are clearly of Indo-Malayan origin. Approximately another 30 are introduced weeds which, like the cultivated plants, are undoubtedly of Indo-Malayan derivation. The aggressive pantropic weeds of American origin which now have a worldwide distribution in the tropics are conspicuously absent in the first Tahitian collections as well as in the early collections from the Friendly Islands, Hawaii, New Zealand, and other Pacific islands. It is a highly significant fact that at least one of these American weeds was among the plants collected on Captain Cook's second voyage.

The significance of weeds in the spread of human cultures has too often been overlooked. The author calls them true commensals of man, as certain to accompany him in his travels as rats, mice, fleas, lice, and intestinal parasites. Man has carried weed seeds as mixtures with seeds of cultivated plants and in the soil in which vegetatively propagated plants, such as the breadfruit, have been transported from place to place. The absence of aggressive American weeds in Tahiti and other islands in the 18th century and the presence of weeds of Asiatic origin tell exactly the same story as the evidence from linguistics: the Polynesians came from the west.

The picture which emerges from Merrill's careful studies of the early literature and of the plants themselves is a splendid vindication of the conclusions of Alphonse deCandolle, the 19th century botanist who systematically assembled the data then available on the origin of cultivated plants and who concluded that those of the Old World and the New represented distinct assemblages. DeCandolle was sometimes wrong in fixing the precise center of origin of a plant, but his conclusion on the separate origin of the cultivated plants of the Old World and the New has never been seriously challenged by any evidence which has been turned up since his time.

Merrill does, however, recognize 3 cultivated plants which are exceptions to deCandolle's general rule. These are the bottle gourd, the coconut, and the sweet potato. The bottle gourd is a "drift" fruit and may have been dispersed by ocean currents. Recent experiments have shown that seeds of the gourd remain viable when the fruit is floated for months in sea water. There is a distinct possibility that the gourd was transported from Africa to South America in prehistoric times by ocean currents. The coconut, although undoubtedly an Old World plant, was established on the Pacific shore from Panama to Ecuador when the Spaniards arrived in this area. Although it, like the gourd, is a drift fruit and is known to have spread from island to island in the Pacific by oceanic drift, Merrill concludes that it was introduced by the Polynesians in their contacts with the west coast of America. It was also these contacts which resulted in the introduction of the sweet potato from America into Polynesia and other parts of the Pacific several centuries before Captain Cook's first voyage. Merrill concedes the possibility that the sweet potato, although established in this hemisphere when the Polynesians made their contacts, is originally an African plant. I see no need, on the basis of the present evidence, for making such an assumption. Certainly the sweet potato is not Asiatic in origin, and did not reach Asia until after 1492. A recent historical study by Ping-ti Ho presents good evidence showing that sweet potatoes, as well as maize and peanuts, were introduced into China in the 16th century.

After pretty thoroughly demolishing all theories involving a pre-Columbian diffusion of cultivated plants, the author presents a rational explanation to account for the rapidity with which both cultivated plants and weeds were diffused over the globe after contact between the Old World and the New was well established

by trade routes. Two of these ancient trade routes were especially important. The Spanish galleon line from Acapulco in Mexico to Manila in the Philippines, established in 1565, is responsible for the occurrence in the Philippines of many American plants, both cultivated and weeds. Even earlier, about 1500, the Portuguese had established a trade route from Brazil to Goa in India via the Cape of Good Hope. This route accounts for the introduction of Brazilian weeds into India and, in the author's opinion, explains the fact that the maize from upper Burma described by Stonor and Anderson is related, as Douglas Oliver and I had earlier shown, to the maize of South America.

Throughout the book the author castigates the diffusionists for their preconceived ideas, illogical conclusions, wild guesses and, above all, for their gross and inexcusable botanical errors. In addition he devotes one entire chapter, the longest in the book, to detailed and specific criticisms of those whom he regards as the worst offenders. F. B. H. Brown, G. F. Carter, T. Heyerdahl, C. Sauer, E. Anderson, and L. Wiener each come in for several pages of critical and caustic comment. Although this chapter may furnish enjoyable reading to those who, like this reviewer, have been annoyed by some of the specious arguments which have masqueraded and sometimes been accepted as science, it must be admitted that the criticism has been overdone and that its repetitiousness tends to obscure the real merit of the book. The facts which Merrill presents speak for themselves and are more damaging to certain current theories of agricultural origins and dispersals than any direct criticism which the author could make.

In spite of this fault — and it is a serious one which the author himself seems to have recognized but not remedied — the book is a veritable treasury of reliable botanical information which will be useful to botanists and anthropologists alike for generations to come. If it deflates some very interesting and artistic theories, there may be both truth and comfort in the assurance of Ernest Renan that "the truths which science reveals always surpass the dreams which it destroys." For if early man is shown to be somewhat less of a culture spreader than the diffusionists have pictured him, he must, by the same token, be credited with greater mental capacity, ingenuity, and inventiveness than has recently been attributed to him. To one who has been repeatedly impressed by the widespread occurrence of these human traits in all parts of the world, this makes good sense.

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The Art of Primitive Peoples. J. T. HOOPER AND C. A. BURLAND. Philosophical Library, New York, 1954. 168 pp., 68 pls., 4 maps. $7.50.

Artist and collector have joined hands to guide the unsophisticated reader to an appreciation of the art of primitive peoples. In 9 brief chapters Burland, a student of art whose specialty is Mexican codices, defines "primitive" and surveys the social functions and historical implications of various art styles. Hooper, the collector, then discusses separately the styles of specific areas from which his collection is drawn: Polynesia, Melanesia, Northwest Coast Indian and Eskimo, West Africa and the Congo. The book is aimed at an audience untutored either in art or culture theory, rather than at professionals. But it provides the reader already aware of primitive arts with over 100 hitherto unpublished objects, among which the Pacific and Africa stand first and second in quantity. Americanists will find no quarrel with the brief but reasonable remarks on Indian cultural origins, and the comments on trans-Pacific contacts, for the authors take a middle-of-the-road position concerning New World-Old World parallels.

If one considers the book, say, for classroom use, defects appear. Though the art works presented are satisfactorily discussed, almost every object is a wood sculpture or wood carving, and their areas are limited; other media, technics, and area styles are not represented. Archaeological materials total 2 pieces, one Mochica and one Chimu pot, so that problems of style development cannot be considered. One hopes for a book on primitive art that will do better justice to theoretical matters. In a book of modest ambition about intellectual problems, such as this, one admires the simple terminology and unpretentious presentation of the pleasurable experiences of art, and finds his keenest regret centered on the immoderately high price.

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Archaeology from the Earth. R. E. M. WHEELER. Oxford University Press, at the Clarendon Press, Oxford, 1954. xi+221 pp., 21 figs., 23 pls. $4.00.

Sir Mortimer Wheeler modestly offers *Archaeology from the Earth* as "the notes and reminiscences of a lengthy and varied archaeological experience," and as such, it is most enjoyable reading. However, this book is much more than reminiscences; it is a searching appraisal of the method and purpose of archaeology. Sir Mortimer is well qualified for this task for his lengthy and varied experience is an outstanding example of the success of the scrupulous methods and humane scholarship which are the subject of his book. His careful and systematic researches into the archaeology of Roman Britain, Roman-influenced India, and the Indus Valley civilization have set high standards of excavation and interpretation.

He sets the pace for his discussion of method in the comment: "There is no right way of digging but there are many wrong ways." He traces the history and development of controlled methods of digging, seeks out and praises the forgotten and partially forgotten scholars who first put these technics to practice, and incisively but justly singles out examples of poor excavation. He comments that Palestine is "where more sins have

probably been committed in the name of archaeology than on any commensurate portion of the earth's surface."

A good deal of the book is devoted to instructive sections on right and wrong ways of digging, but the lesson of it all is that archaeological method consists of a set of general principles which can be made to work under varied conditions in all parts of the world. He has long argued, for example, that rigorous training in the excavation of sites in Roman Britain provides an adequate background for work in all periods and regions. He emphasizes the importance of stratigraphy, grid systems of control, neat excavation, careful planning, and meticulous recording.

There is much in the British application of some of these principles to recommend to American archaeologists. (Wheeler's colleague, Kathleen Kenyon, has written an excellent introductory text, *Beginning in Archaeology*, which may be considered a manual of the best in contemporary British archaeological method.) The quadrant method of digging burial mounds has proven successful in the excavation of English barrows and should be used more extensively in the eastern United States. Wheeler's emphasis on the value of visible stratification finds expression in the leaving of balks or walls of unexcavated deposits on all 4 sides of every grid square. This is an interesting contrast to the technic of first isolating the grid block by trenching around it which was used by Webb to insure against loss of stratigraphic data in the Pickwick Basin. The chapters on the planning of an excavation and the organization of a staff to carry out the plans should be required reading for all aspiring archaeologists.

On the other hand, some of Wheeler's remarks on the use of the stratigraphic method, grid systems, and test trenches indicate that American archaeologists have failed to adequately demonstrate the value of some of their applications of the general principles of the discipline. While his strictures on the use of an arbitrary datum as a substitute for stratigraphic associations are well taken, his unhesitating condemnation of any stratigraphic analysis not based on visible soil changes runs counter to the success of the "metrical" stratigraphy which is widely used in the New World. The distinction between the 2 concepts of stratigraphy and stratification which is made by Phillips, Ford, and Griffin in their *Archaeological Survey in the Lower Mississippi Alluvial Valley, 1940-1947* provides a convincing argument for the American practice. His rigid application of the grid-square system of excavation belies his code of a flexible method. Just as visible stratification is preferable to arbitrary levels, so building units are more appropriate to the excavation of an architectural complex than arbitrary grid squares. Moreover, although the test trench is misused in the New World at least as much as in the Old, few of Sir Mortimer's American colleagues would be willing to join him in abandoning the test pit as no more than a poor substitute for good planning. Indeed, American practice has shown that the test pit is a valuable aid to successful planning.

Wheeler makes his most important contributions in the chapters on the use of archaeological data and the purpose of archaeological research. The section on publicity is especially good. He makes a strong case for the need for more and better popularization of the results of digging. His strenuous objection to the trend to make archaeology primarily a science leads him to emphasize the dominant role of the subjective element in archaeological interpretation. He asks for a more humanistic approach to archaeological problems, but sees as much danger in the narrow view of the humanistic contribution that for so long plagued Classical archaeology as he does in a cult of objectivity. He suggests that future work should be characterized by less testing and reconnaissance and more intensive excavation of whole sites. This suggestion emphasizes his interest in the detailed study of populations which he considers the greatest problem facing the archaeologists of the next 30 years.

It is refreshing to find that in contrast to recent American trends, Sir Mortimer urges a renewal of interest in the great civilizations: "We need not close our eyes to Man-the-Jelly-Fish or Man-the-Whole-time-Food-gatherer in order to believe in Man-with-Time-to-think-between-Meals, in Civilized Man, but the last is, surely, of overriding importance."

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Arctic Area. HENRY B. COLLINS. Program of the History of America: I, Indigenous Period, No. 2, Comisión de Historia, No. 68, Instituto Panamericano de Geografía e Historia, Pub. 160, Mexico, 1954 (Spanish ed. 1953). 152 pp. $1.00.

This brief volume provides an amazingly comprehensive coverage of the anthropology of the Eskimos, Aleuts, and contiguous North American Indians. It is an outline of essential facts and systems of interpretation. With a bibliography for each of the 41 chapters (designated as themes), it constitutes a useful text for class use.

Part I is devoted to a summary of the pertinent racial, linguistic, cultural, and geographic facts. In Part II, "The Old World Affinities and Origin of Eskimo Culture," Collins presents the data from those sites in the Old World which bear resemblances to the Old Bering Sea, Ipiutak, Dorset, and Denbigh cultures. In sketching the origin of Eskimo culture careful distinction is made between the "remote, ultimate sources of the culture and the development of the several regional patterns or complexes that we now call Eskimo." He suggests that the "South Alaskan Eskimos and Aleuts, and the Dorset people, left Bering Strait before the northern pattern of Eskimo culture was fully formed, and subsequently each had its own course of development in its own locale." In Part III, "Archaeology of Arctic America," a chapter is given to each local development: Kachemak, Kodiak, Aleutian, Bering Sea coast, Old Bering

Sea, Punuk, Birnirk, Ipiutak, Thule, Dorset, and Denbigh. Conflicting interpretations are presented with the skill of a scholar who has himself tussled with these major problems. He evaluates the criteria which have commonly been used as evidence of inland origin of the Eskimo and of the Arctic Whale Hunting Culture, thus enabling the reader to make his own analysis. Part IV, "Ethnology of Arctic America," following Birket-Smith's division of the Eskimo into 14 major groups, ranges from the Pacific Eskimos to the East Greenland Eskimos and includes 3 themes on the Eyak, Athapaskan, and Algonkian Indians. Not the least useful portion of this synoptic outline is Part V, "The Northern Indians and Eskimos in the Post-European Period," in which attention is given to effects of European contact on the native populations and also the persistence and influence of certain native culture patterns.

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Dutch Hollow, an Early Historic Period Seneca Site in Livingston County, New York. WILLIAM A. RITCHIE. Researches and Transactions of the New York State Archeological Association, Vol. 13, No. 1 (also issued as Research Records of the Rochester Museum of Arts and Sciences, No. 10), Albany, 1954. iv+98 pp., 30 pls., 6 tables. $2.25.

Ritchie's previous publications have established his pre-eminent position in the field of prehistoric archaeology in the Northeast. The Dutch Hollow report marks his first major contribution to the historic archaeology of the area. He brings to it the same meticulous attention to detail and breadth of scope in interpretation which have distinguished his earlier work.

Dutch Hollow is one of the very early historic sites in the Genesee Valley. The valley itself is of extraordinary interest to the archaeologist and the ethnohistorian. It contains some 22 sites, believed to be Seneca, ranging from late prehistoric in its upper reaches (for example, Richmond Mills), through protohistoric (Adams, Dutch Hollow, Factory Hollow, and others), down to historic (Rochester Junction and others) in its lower portions. Probably nowhere else in eastern North America does a similar situation prevail. If the thesis pertaining to these sites as a whole is correct, this string of villages should provide a complete sequence of cultural material for the life duration of the Seneca, thereby affording as full an examination as is ever likely to be possible of the cultural development, including its acculturation to European life, of a single tribal entity. Dutch Hollow is the first of these sites to have been accorded official study and the report upon it is correspondingly significant.

In 1934 Ritchie, with WPA assistance, excavated Cemetery I at Dutch Hollow. The site was known to include some 15 acres of village area, but since this had long been under cultivation and had been much dug over by collectors no attempt was made to excavate it. The discovery a decade later of 4 additional cemeteries added considerably to the volume of material surveyed in this report. Ritchie describes the most significant burials in Cemetery I and the artifacts and ceramics, and discusses concepts of the supernatural, chronology, and trade relations. Appended are a bibliography and condensed records of the burials in the 5 cemeteries. There is a brief discussion by this reviewer on the trade beads based largely on Wray's classification.

From the vantage point of Dutch Hollow, Ritchie indicates the threads of continuity persisting from the distant past, and adumbrates some of the customs which were to become more firmly established in subequent years. For example, the later popularity of the articulated carcass of the snapping turtle for use as a rattle was foreshadowed at Dutch Hollow by the presence of the box turtle shell, and the peach-stone game by spheroidal antler objects and wooden bowls. In the section, "Concepts of the Supernatural," Ritchie notes the emergence among the historic Seneca of the practice of "providing equipment for the use of the dead," but as yet no good answer for this phenomenon is forthcoming. The same practice has been noted for the Huron and probably the Neutral, supporting a pan-Iroquoian development and thus indicating the need for research beyond the confines of the Genesee Valley.

The materials in use at Dutch Hollow are graphically described, and the first faint trend toward acculturation noted. While European firearms were not found, triangular arrowpoints were being cut from brass in limited numbers, iron axes of 3 types were beginning to replace those of stone, just as 7 brass kettles adumbrated the impending changes in culinary equipment. However, the 114 pottery vessels found in the graves showed no significant variation from the sherds from the village area, except that, in the main, they seemed not to have been used and hence were probably made for interment. Ritchie found the pottery to conform well to MacNeish's Iroquoian ceramic typology, although the presence of trade pieces raises some problems.

With the assistance of Georg Neumann, the author assessed the small amount of skeletal material preserved in Cemetery I and found the crania to be predominantly Otamid in affiliations, a strong contrast to the exclusively Lenapid character of presumed Seneca material from prehistoric sites. Ritchie suggests that the replacement occurred "through infiltrations and acculturation, rather than by conquest . . . since there is no sudden replacement or major shift in the composition of the population or ceramic styles." Since the skeletons showed no evidence of trauma, it would seem that there is a possibility that the warriors who died violent deaths were not customarily buried at home, and that the cemetery population is to that extent unreliable.

The presence of artifacts of European origin not only identifies Dutch Hollow as a contact site, but implies the possibility of dating it in terms of our calendar. Unfortunately, this is not so easy to do as would appear on the surface. No known written records refer to it. The amount of trade goods is relatively small, and such

as there are have not yet been pinned down chronologically to specific dates. However, the series shows a progression of trade goods from none at Richmond Mills to a majority at Rochester Junction with a fairly regular increase from site to site as one advances down the river. Conversely, the proportion of native artifacts decreases. Wray has made a careful study of the trade goods from most of these sites, and proposed a chronology for them. Dutch Hollow, due to its high location in the series and its small ratio of European to native products, is assigned to the interval 1590-1616 (Wray and Schoff 1953, *Penn. Archeol.*, Vol. 23, No. 2, pp. 53-63). Although Ritchie accepts this dating the situation remains unsatisfactory for the ethnohistorian, who will continue to press for an absolute chronology. The only hope of attaining this now lies in a minute study of the trade goods, which may narrow the margin somewhat but is hardly likely to result in finality. Ritchie surveys the possibilities surrounding the protohistoric contacts by which the Seneca of Dutch Hollow might have obtained their European possessions. He relies chiefly on Biggar (1901, *The Early Trading Companies of New France*). There are more recent sources, such as Harte (1932, *Some Evidence of Trade Between Exeter and Newfoundland up to 1600*. Devonshire Ass'n for Adv. of Sci., Lit. and Art, Vol. 64, pp. 475-84), but even if used they would have helped but little for the problem is insoluble by historical means. The only recourse seems to lie in prolonged archaeological research along the principal routes from the seaboard to the Seneca country. Such a program, if carried out in conjunction with a typological survey of the trade goods, should do much to clear up the dating and the directions from which the influence came.

Despite minor faults, the Dutch Hollow report will take its place alongside the other important contributions which Ritchie has made, and it is to be hoped that it will be followed by others from him on more Iroquoian sites in the Genesee Valley. The Morgan Chapter, the New York State Archeological Association, and the Rochester Museum Association merit the thanks of all those interested in the archaeology of the Northeast for making the report financially possible.

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Walam Olum or Red Score. The Migration Legend of the Lenni Lenape or Delaware Indians. A New Translation, Interpreted by Linguistic, Historical, Archaeological, Ethnological, and Physical Anthropological Studies. Indiana Historical Society, Indianapolis, 1954. xiv + 379 pp., frontis., 192 facsimile illus., 2 maps (on endpapers). $15.00.

This sumptuous volume contains the results of a 25-year study of one of the strangest documents in American anthropology, the tribal chronicle of the Lenape. With its 183 "verses" totaling less than 3000 words in the English translation, it may seem a surprisingly short record to have received such extended scrutiny. It is said to relate "the tribal story from the Creation to the coming of the White man to North America. The main themes are the migration from Asia to Alaska and south and east across the North American continent, and the chronological presentation of the chiefs by which time was measured in the epic" (p. ix). The story was obtained by Constantine Rafinesque in 1820-22 and transcribed by him in the Delaware language. His manuscript included copies of the pictorial mnemonic aids accompanying it, the originals of which have since been lost. He published his translation in 1836. Squier published a translation in 1849, and in 1885 Brinton's text and translation appeared. With this new translation by C. F. Voegelin the full Delaware text and the "pictographs" are made available for the first time in correct transcription and in facsimile.

For the archaeological reader interest will center on the detailed appraisal by Glenn A. Black of the extent to which events in the chronicle are supported by archaeological data. But the 290 pages preceding this section contain much of interest also. Paul Weer traces the history of the document, concluding that the "Dr. Ward" from whom Rafinesque said he received it cannot be historically identified, and that, therefore, the circumstances of its origin are undeniably clouded. Facsimiles of the original document are presented with the translation and linguistic notes by C. F. Voegelin and Joe E. Pierce, accompanied by brief ethnographic comments by Erminie W. Voegelin. Eli Lilly contributes a most valuable concordance of the pictographs and some startling "Speculations on the Chronology of the Walam Olum and Migration of the Lenape." He goes further than other contributors in treating the chronicle as a reliable historical record, presumably believing that little modification has resulted from verbal transmission through the centuries. Identifications are suggested for localities referred to only in brief and cryptic terms, and no alternatives considered. "'Where the land slopes north' . . . must have been northeastern Asia" (p. 277); beginning with this assumption the subsequent events of the legend are considered to fit a migration across Bering Strait and to the south and east. Lilly also assumes that the lists of chiefs are a reasonably complete record and that their average period of rule in historic times, 13.67 years, can be applied to the whole chronicle. Therefore, "we have the Lenape crossing Bering Strait about A.D. 366, at Snow Mountain about 808, crossing the Mississippi (?) near 1000, spending the years between 1136 and 1245 on 'the middle reaches of White River,' and crossing the Alleghenies about 1327" (p. 277).

The archaeological consideration of the Walam Olum by Glenn Black is more cautious and tentative, and deals only with the last part of the Lenape migration story. His main thesis (which is supported by a final contribution by Georg K. Neumann) is that the legend records the movements of the Lenape from the Middle West, where they participated in the Hopewell culture, to the east coast, where they were one of many similar

Algonquian groups sharing in Woodland culture. Black discusses in detail the efforts made by the Indiana Historical Society to locate a documented Lenape village, as the archaeological starting point for this study. In a sense, the search failed, because such a site could not be identified beyond possible doubt, but the search contributed greatly to our knowledge of eastern prehistory and contact history. Much of the research carried out on this program has been or will be reported on elsewhere by the participating archaeologists: Edmund S. Carpenter, Dorothy Cross, Catherine McCann, Richard S. MacNeish, William A. Ritchie, and John Witthoft, but all of it is drawn on by Black. He concludes "that the Late Woodland material herein thought to be protohistoric Lenape has as its direct ancestral background materials west of the Allegheny Mountains on a late Middle Woodland time level" (p. 319). Going further, he states, "The connections are through and to Middle Woodland culture of the central Ohio Valley, and if any connnection is possible, at this time level, other than with Hopewell, the evidence for it has been completely overlooked" (p. 325). It is also suggested that if the Lenape's ancestors were at least partially responsible for the Hopewell culture, the rival group, the Talligewi, whom they found in eastern Indiana and southwestern Ohio when they arrived from further west, may be the Adena people. The legend states that with their northern friends (presumably the Iroquois) they conquered the Talligewi or drove them south.

Black does not attempt to find archaeological verification for the Walam Olum story prior to Middle Woodland times, but does note that Woodland materials occur further west. But for the periods on which he has focused his attention he has produced a valuable synthesis of the culture history of a major segment of "Woodland" culture. It will be useful entirely aside from its relation to the Walam Olum, since this is a period and area for which the data have remained confusingly fragmented in spite of important previous attempts at synthesis.

Concerning the Walam Olum in general Black suggests that much of it may refer to the Algonquian linguistic family as a whole, and points out, as does Neumann, that an early migration from Asia of bearers of a "Woodland" culture is not unreasonable in view of the developing archaeological evidence.

No one interested in American archaeology should ignore this volume, as it represents one of the most ambitious programs ever undertaken for unraveling the complex history and prehistory of an Indian tribe. The volume could have been many times its present length, if Erminie W. Voegelin's too-brief remarks on parallels with other tribal legends were expanded, if the linguistic and ethnographic "background" material collected were included in full, and particularly if all the important archaeological and historical researches conducted as part of this program were reported here.

It may be that in the future some of the interpretations proposed by contributors to this volume will be refuted, but the long cooperative work of this group of scholars has produced much new material of basic importance for the archaeology, ethnology, and contact history of the eastern United States, far beyond its specific application to this legendary chronicle.

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Hopewell Sites in the Big Bend Area of Central Missouri. JOE J. MCKINNEY. Missouri Archaeologist, Vol. 16, No. 1, Columbia, 1954. 54 pp., 12 figs., 4 tables, 1 map.

This paper is a preliminary descriptive report of 6 Hopewellian sites in the Big Bend area of the Missouri River in Saline and Carroll counties in central Missouri. Each site and the collection from it is described individually. Trait lists from all sites are compared in tables at the end of the report. Although most of the ceramic, lithic, and bone artifacts were from the surface, some were from test pits. The collections are not large, but they are so well described and so well illustrated that the report should be of considerable value, not only to those interested in the Hopewell culture in Missouri, but also to anyone interested in a comparative analysis of the Hopewellian culture in the Middle West.

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Preliminary Salvage Archaeology in the Pomme de Terre Reservoir Area, Missouri. CARL H. CHAPMAN. Missouri Archaeologist, Vol. 16, Nos. 3 and 4, Columbia, 1954. 116 pp., 28 figs.

The Ozark Highland region of Missouri and Arkansas has awaited more detailed archaeological treatment since the Bluff Dweller material was first discovered there some 30 years ago. In this volume Chapman describes some 179 sites located in Polk and Hickory counties in southwest Missouri and discusses the artifacts obtained from surface survey as well as test excavations. The conclusions which he was able to draw unfortunately contribute little to a greater clarification of the archaeology of this area. The meager results were not the fault of the author for he analyzed the material carefully and classified the projectile points with an industry which perhaps they did not deserve. The most startling result of his analysis was the lack of any very significant patterns. The conclusion that the Ozark area was one of low cultural intensity coupled with low population density cannot be denied.

Chapman's survey data consist mainly of 2103 projectile points and 1948 other stone artifacts. The largest number of this latter category was 792 flint blanks. Only 35 potsherds were found. The points were subjected to a most rigorous classification with 19 major descriptive categories and 30 subcategories, not to mention type U (unclassified) which made up nearly 8% of the total. Fortunately some of these numerous de-

scriptive categories were joined together as meaningful complexes in the concluding section. However, the method of letter designation of types certainly gets out of hand and it takes a more agile memory than that of this reviewer to keep type Bld1 long separated from Y5. Moreover, some of these types have already been named, for example, Graham Cave Notched (Chapman's K1). The advantages of the type name in projectile point classification would seem obvious in many instances in this study.

If the surface survey was extremely reticent in giving meaningful results, the test excavations were no less so. Of the 6 sites tested only 2 produced sufficient data to set up tentative cultural complexes, and these sites were practically contiguous and quite similar in content. Chapman has established 5 tentative occupations. The latest is a post-European complex posited on very slight direct evidence — a gun flint and a piece of an iron kettle. Two quite similar occupations, noted mainly from the excavated material, are representative of a "Late Woodland Complex." Both have small, side-notched and plain, triangular projectile points, but one has considerably more of the grit-tempered pottery than the other. The further separation of these 2 complexes is based mainly on minor differences in scraper and projectile point types.

An earlier occupation with corner notched points of Hopewellian affiliation is also noted with associations in Missouri with straight stemmed and basal notched points of a general Archaic tradition. Flint adzes are classed as occurring in this same complex. Finally a nonceramic Archaic complex consists of Graham Cave notched points (type K1); type L points which are similar at least in description to some Dalton-type points, although this specific resemblance is not mentioned by Chapman; type H, a beveled, stemmed form; and type C1, a stemmed form with expanded base which is equated with a similar type of preceramic date in Oklahoma. Chapman adds full-grooved and chipped, notched axes to this complex.

One can hardly restrain a certain impatience with the Ozark archaeological situation, but given the meager data which are available at present, Chapman is to be commended for his sparse and tentative alignment of complexes. The hope is retained that the further work recommended in the Pomme de Terre area as well as that now being carried out in the White River region will go far toward clarifying the Ozark Highland picture.

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Central Texas Archeologist. Edited by FRANK H. WATT. Central Texas Archeological Society, No. 6, Waco, 1953. 104 pp., 18 drawings, 19 pls., 5 maps. $3.50.

Prior to World War II a group of capable, nonprofessional archaeologists in and around Waco, Texas, published 5 issues of the *Central Texas Archeologist* under the able editorship of Frank H. Watt. Many worthwhile articles on the archaeology of the area were included in these issues. The group was inactive through the war years and after, but reorganized in 1951. The present issue contains 4 articles on the archaeology of the central Texas area, 2 on that of other sections of Texas, 1 on North Dakota, and 1 on New Mexico.

In the lead article a geologist, Frank Bryan, discusses the geological age of the Llano Estacado and some of the archaeological materials found in "The Coyote Lake Midden." His interpretation will be challenged as extreme by many, especially in view of the somewhat different interpretations by other geologists and archaeologists for the Clovis, Plainview, and Lubbock sites. In "Archeology of Coryell County" Frank Simmons reports several types of sites, ranging from early to late, which he has investigated in that central Texas county during the past 40 years. He presents some interesting tentative suggestions based on his own logical reasoning and aided by the geological interpretations of Frank Bryan. William A. Atlee, in a report of a "Caddo Burial in Northeastern Texas," very briefly describes a burial and 2 pottery vessels of Titus Focus types from Upshur County. With equal brevity Watt describes an "Ash Pit in Buried Midden on the Brazos River" near Waco.

The only article by a nonmember of the society is "Indian Trade Beads from Fort Berthold, N.D." by G. Hubert Smith of the Smithsonian Institution, River Basin Surveys. His illuminating description of trade beads of the mid-19th century in North Dakota derives from the River Basin Salvage Program. The article is directly related to 2 papers on similar beads from central Texas by Watt and W. P. Meroney in Number 3 of this same series of publications. Watt, in "Pottery Diffusions of the Central Brazos Valley," very capably discusses the derivation, variety, and amount of pottery in that region. He derives this pottery, limited in quantity as it is, largely by trade and almost entirely from the Caddoan area to the east during the centuries following A.D. 1200. Roger Conger's brief report on "Iron Trade Hatchets in Central Texas" is a significant reference item. Finally, Otis Marrs, in "Some Mimbres Pottery Finds," describes the considerable quantity of materials he has collected on 3 trips to New Mexico, with careful documentation and good illustrations of the specimens.

In spite of some unfortunate typesetting errors, most of which are corrected in an included errata sheet, and some debatable interpretation in a couple of the articles, the publication is very good and is a worthwhile contribution. Most of the articles are written in tentative terms with the explicit intent of arousing discussion and criticism as well as providing factual material. Illustrations, line drawings, and maps are excellent. It is to be hoped that No. 7 of this series will soon appear.

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Clay Figurines of the American Southwest. NOEL MORSS. Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, Vol. 49, No. 1, Cambridge, 1954. x+115 pp., 31 figs. $3.50.

The main purpose of Morss's report is to describe in detail a series of 11 elaborate unfired clay figurines found in 1950 by a local rancher cached in a recess of an occupational cave near Price in northeastern Utah. The pieces are believed to date from the 11th century. In attempting to appraise the chronological position and cultural significance of the cache series the author reviewed all of the data on archaeological occurrences and ethnographic functions of such items, and in bringing together these varied data he has performed a task for which everyone interested in the subject will thank him.

The figurines, each approximately 6 inches tall, are elaborately decorated with fillets of clay representing hairdress details, ornaments, and clothing. All are painted, particularly with stripes on the face. It is presumed that one figurine has strayed or been lost, since 10 are matched as male and female pairs, leaving one unattached female.

The distributional survey of figurines takes up first the "northern tradition" (Basketmaker II, III, and the Utah-western Colorado areas) with the conclusion that the 11 in question are outstandingly elaborate examples of the Northern Periphery figurine complex and can be dated as of the 11th century. Next the "southern tradition" (Mogollon, Hohokam, and peripheral western Arizona and northern Mexico) figurines are cited in detail with the conclusion that the early Anasazi figurines (Basketmaker II, III) were perhaps derived by "stimulus diffusion" from the earlier southern complex.

Attention is paid to areas outside the Southwest, and Morss inclines to view the Central California figurines as historically connected with the "northern tradition" figurines of the Southwest. Western Texas, the Lower Mississippi, and Plains are surveyed, and Mexico as a source of Southwestern figurines is discussed with little result. The babe-in-cradle figurines are widespread and are suggested as evidence of an ancient and widespread increase cult, and the main conclusion of the study is that "the gynecomorphic figurines of the Southwest . . . are related to a human increase cult involving concepts basically unchanged since Paleolithic times, and not to an agricultural increase cult or to concepts of a Corn Mother or Corn Maidens." Morss sensibly suggests that the joint appearance of pottery and agriculture in early horizons may have offered a means for the production of imperishable figurines, and that there is no necessary functional linkage of figurines and farming through agricultural fertility rites.

Altogether this monograph goes a long way toward synthesizing the scattered data and trying to fathom the purposes for which figurines were made. Newer data, accumulating ever more rapidly (EDITOR'S NOTE: see FACTS AND COMMENTS, this issue), and differences of interpretation of the cultural significance of miniature anthropomorphic figures will make the subject a continually live one, but Morss must be given credit for having written the first major American contribution on the subject.

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Pajarito Plateau and its Ancient People. EDGAR L. HEWETT. Revised by BERTHA P. DUTTON. With special section by Kenneth M. Chapman. University of New Mexico Press and School of American Research, Albuquerque, 1953. 174 pp., 84 figs., 15 pls. $4.50.

In 1938 the University of New Mexico Press published in its *So Live the Works of Men* series the original edition of this compilation of Hewett's reconnaissance and excavation on the Pajarito Plateau, west of Santa Fe, New Mexico, in the early years of this century. This volume had been out of print for several years prior to this revision. Dutton, The School of American Research, and the University of New Mexico Press deserve credit for making this work once again generally available. It is unfortunate that other, perhaps more important, anthropological studies, such as Bandelier's *Final Report*, can not be reprinted.

From a technical viewpoint, the Press has continued its high standard of competence. Two minor criticisms, however, should here be noted. A foreword by the revisor, stating her intentions, revisions, additions, and deletions from the original should have been included. There is, of course, always the question of whether the revisor should incorporate his or her remarks in the general body of the text, thus leaving the reader in doubt as to the original author's exact remarks, or relegate them to footnotes or parenthetical statements. Secondly, the illustrations of pottery vessels could have been more precisely identified as to type; and the list of illustrations in the original edition should not have been omitted from the revision.

The new edition follows generally the same outline as the original and Hewett's easy style has been very little altered. In the Preface and Part 1 the author set down some of his "archaeological philosophy." While the writings of some early Southwesterners are not now considered in the best scientific style, many of them, such as those of Hewett, emphasized points of modern concern such as the inseparableness of archaeology and ethnology.

In Part 2 Hewett describes the physiography and the major ruins of the Pajarito Plateau, and in a third section relates, in a not too detailed manner, his excavations there. It is in these 2 portions that Dutton has made most of her contribution. While little actually has been revised here, a number of worthwhile additions to the original text have been made. Prefacing the site descriptions, Dutton briefly discusses the ceramic taxonomy for the region, and following each description she lists the principal pottery types of the site, with their approximate dates. Treering dates, where

available, are given. Ruins located within the boundaries of the Los Alamos atomic facility and hence unavailable to visitors are also noted. At certain points where it is felt that the reader may desire additional information, references to materials published since the date of the original edition are made.

The fourth, and final section of the book, which originally was called "The Debris of Pajaritan Culture," has been retitled, in recognition of the present-day residents of the Pajarito, to read "The Continuity of Pajaritan Culture." In an added part the development of the region from the founding of a private school in 1917 to the establishment of Los Alamos County in 1949 is recounted. Of more interest to anthropologists, however, are the data on possible historic and modern Tewa relationships to the prehistoric Pajaritans. While Hewett considered this, he did so primarily in the light of Tewa tradition, and Dutton has not, in the revision, utilized to the fullest the recent data bearing upon the question. While it is recognized that this book was and is intended primarily for the nonprofessional, the revisor could well have outlined current opinions, especially of Hawley and Reed, which tend to strengthen, in part, Hewett's attempted correlations.

In summary, while many creditable data have been added, certain of the criticisms leveled by Spicer in his review of the original edition (1940, *Am. Antiq.* Vol. 2) are valid for the revision. For the "general reader," this work will provide enjoyment and some understanding and appreciation of archaeology. For the professional anthropologist, a more detailed analysis of material remains, correlated with those of subsequent excavations and ethnological investigations in the region, would have been highly desirable.

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Archaeological Studies in the Petrified Forest National Monument. FRED WENDORF. With appendix by Anna O. Shepard and special sections by Kate Peck Kent and Earl H. Morris. Museum of Northern Arizona, Bull. 27, Northern Arizona Society of Science and Art, Flagstaff, 1953. x+204 pp., 96 figs. $6.00.

The Petrified Forest in east central Arizona is of importance archaeologically because it lies between the areas of distribution of 4 "cultural traditions": Anasazi to the north and east, Sinagua to the west, Hohokam to the southwest, and Mogollon to the south and southeast. Excavation in the earlier Petrified Forest sites might be expected to reveal significant information concerning the origin and interrelationships of the surrounding "traditions." In an effort to realize this potentiality, Wendorf made a survey of collections from the Petrified Forest in 1947 and excavated there in 1949 and 1950. His publication consists both of a report of the excavations and a discussion of their significance for the problem of relationships.

As a report of excavations, the monograph impresses me most favorably. Wendorf selected 2 sites, Flattop to exemplify the earliest period of occupation in the area, and Twin Butte, the subsequent period. His excavations appear to have been carefully done, despite the handicap of uncomfortable climate, and they are reported in detail, with good illustrations of both the architectural features and the artifact types. Each descriptive section is followed by one of comments, in which the features or types are thoroughly compared with finds in other parts of the Southwest and, wherever possible, are also interpreted functionally. The result is a nice picture of the older remains in the Petrified Forest, their resemblances, and their cultural significance.

In an introductory chapter, preceding the reports of excavation, Wendorf presents a review of current methods of classifying cultures in the Southwest, which is to be recommended as a succinct, unusually dispassionate, and up-to-date review of the subject. In it, he proposes to use both the Pecos classification and the Gladwin-Colton system of phases (foci). He keeps the two quite distinct in the reports of excavation, using the Pecos classification primarily to refer to divisions of the Anasazi sequence and the system of phases only when referring to units within the Hohokam, Mogollon, and Sinagua traditions. In the concluding, interpretative chapter, on the other hand, he treats the stages of the Pecos classification purely as time periods and dates the phases of Anasazi as well as Hohokam, Mogollon, and Sinagua culture with reference to these periods. The reports of the excavations would have been clearer to me if he had followed the same practice there.

Also in the introductory chapter is a brief but comprehensive discussion of dendrochronology in the Southwest, in which Wendorf concludes that this method is not very useful for the dating of phases in the present stage of its development. In its place, he proposes to rely upon ceramics and, in particular, to equate each of his phases with the corresponding period in the Pecos classification by the use of a single diagnostic criterion, such as neck-banded gray pottery in the case of Pueblo I. He justifies this procedure by assuming that pottery diffuses more rapidly than other elements of culture and is therefore the best "index fossil" for establishing contemporaneity of phases, especially in instances of cultural lag, for example, when an architectural pattern typical of Pueblo I time has persisted into the Pueblo II period. As Wendorf points out, this is a common practice in many parts of the New World. It is, however something of an innovation for the Southwest, although the Gladwins come close to it when they line up the phases of their various branches chronologically by equating them with divisions of the Pecos or Globe classification. Using this approach, Wendorf concludes that the Flattop site represents a new, Flattop phase of culture, dating from Basketmaker II time. He assigns the Twin Butte site to the already well-known White Mound phase, which is Basketmaker III in age.

The Flattop phase is characterized by pottery of the Adamana Brown type; small, oval to round, slab-lined

pit houses with lateral entryways; and slab-lined storage bins. A primary dependence upon agriculture is indicated by the presence of charred corn and numerous metates and manos, along with a rarity of animal bones. Except for the storage bins, these are not traits one would expect to find in Basketmaker II time, but the date seems to be justified by (1) the absence of any Basketmaker pottery in the Flattop site, although it is predominant in the later Twin Butte site, and (2) the occurrence of a few Adamana Brown sherds in the lower but not the upper levels at the Twin Butte site.

Some authors might have cited this early occurrence of pottery, slab-lined pit houses, and primary dependence upon agriculture as proof of the priority of the Mogollon tradition over the Anasazi and as a justification for distinguishing between the two. Wendorf, however, refrains from identifying the Flattop phase as either Mogollon or Anasazi. He notes that Flattop is probably contemporaneous with a number of Mogollon sites and phases (Bluff, SU, Cave Creek, San Simon, Harris, Mogollon, and Starkweather) but feels that the differences in ceramics from these sites outweigh certain similarities in architecture and stone artifacts. He is inclined to think, too, that there may be closer relationships with Hohokam (and, by implication, Sinagua), because of certain similarities in ceramic technology to be discussed below, but this cannot be demonstrated because of the incompleteness of our knowledge of the earliest phases of Hohokam and Sinagua culture.

By contrast, the Twin Butte site is practically identical in culture with the classic Basketmaker III sites further north, except for the presence of a large amount (nearly 50%) of brown ware like that in the contemporaneous Mogollon sites to the south. After considering a number of alternative explanations for this occurrence, Wendorf concludes that, while the predominant Lino (Basketmaker) pottery is probably of local manufacture, the brown ware can best be attributed to trade from the Mogollon area to the south. Anna O. Shepard discusses this matter further in an appendix on the color and paste composition of the pottery and, while she is unable to reach a definite conclusion, she does not consider Wendorf's hypothesis unreasonable. I would myself favor the alternative theory that, because the Twin Butte people lived in a borderline area, they may have adopted the ceramic traditions of both their northern and southern neighbors. This is more in accord with the situation in the eastern United States, where it has been shown that pottery types and series may vary in popularity through space in the same manner that they do through time.

In any case, it is clear that the Flattop and Twin Butte phases are quite different, with the former having primarily resemblances to the south and the latter to the north. Wendorf is most impressed with the fact that Flattop pottery, like that of the Hohokam and Sinagua, is finished by the paddle and anvil method, whereas Twin Butte pottery, like that of the Anasazi and Mogollon, is finished by the scraping technic. He believes that these 2 technics, if not the phases themselves, may have had different origins.

The final chapter contains a discussion of the distribution of the paddle-and-anvil and scraping technics throughout the world. A number of alternative hypotheses concerning the origin of the former are presented, but Wendorf appears to favor some sort of relationship with Woodland pottery and, through it, with the ceramics of the Old World. From the Flattop site, he traces the paddle-and-anvil technic through Hohokam, Sinagua, and Colorado River-Great Basin pottery to the modern Pima, Papago, Yuman, and Shoshonean tribes. By contrast, he derives the scraping technic from Mesoamerica and notes that it has persisted through the entire Anasazi sequence and is still to be found among the modern Pueblo Indians.

Wendorf was preceded in making the distinction between paddled and scraped pottery by Schroeder (1947 *Southwestern Jour. of Anthro.*, Vol. 3, No. 3, p. 235; 1952, same journal Vol. 8, No. 3, p. 333), who mentioned it in support of his theory that it was the Sinagua rather than the Salado who influenced the Hohokam about A.D. 1150. To Schroeder, however, the distinction was simply a means of establishing relationships between *cultural* traditions; he did not view it as a matter of 2 separate *ceramic* traditions which, as Wendorf recognizes, may have been cross-cultural in their distribution.

Reference might also have been made to Linton's paper on North American cooking pots (1944, *American Antiquity*, Vol. 9, No. 4), since this, too, suggests an Asiatic origin for Woodland pottery, although on the basis of function rather than technology. Wendorf does note, as a point against the theory of Flattop-Woodland connection, that the typical Woodland shapes, upon which Linton had based his functional interpretation, are lacking in the earlier paddle-and-anvil finished pottery of the Southwest. Since the characteristically rough surfaces of Woodland pottery are also for the most part missing, I am not too impressed with the theory of origin in Woodland-Asiatic ceramics. It seems to me that independent invention in the Southwest is a more likely hypothesis.

Within the Southwest, though, the distinction between paddled and scraped pottery may well be an important one. And it seems to me a step forward to emphasize, as Wendorf does, individual elements of culture and their relationships, instead of arguing about the number and interrelationships of whole cultures, since it is only by building up a picture of connections on the level of individual elements that we will eventually be able to arrive at a sound knowledge of the relationships among phases.

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Prehistoric Stone Implements of Northeastern Arizona. RICHARD B. WOODBURY. Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, Vol. 34, Reports of the Awatovi Expedition No. 6, Cambridge, 1954. xiii+240 pp., 41 figs., 19 tables. $7.50.

This volume is concerned with stone artifacts recovered during the Peabody Museum's work in the Jeddito district of Arizona. In 5 field seasons (1935-39), 8351 stone implements were recovered from 26 sites ranging in time from Basketmaker III to early Pueblo V, the majority from the pueblo of Awatovi. To review such a study as this in a brief space is like reviewing an abridged dictionary — one can report the methods and degree of coverage but cannot adequately discuss the contents.

In the preface Woodbury states the purpose of the report, outlines the methods of description, and summarizes his general conclusions — an excellent feature. A discussion of the time of completion of the manuscript points up, once again, the lag between performance and publication, a factor which in this case did not permit a test of the hypothesis of Mogollon and Anasazi pueblo differences which Reed published in 1946 and 1948.

Part I consists of an introduction with discussions of the geography, chronology, and cultural position of the various sites; the sites themselves, including the extent of their investigation by the expedition; and procedures of field and laboratory work. This is followed by a consideration of the value of a stone artifact study in temporal-spatial studies, in interpretation of technology, economy, and total culture, and in the study of culture change. The various categories of material are described in Part II. There is no obvious reason for the sequence followed, since the artifacts are not grouped according to technics of manufacture, supposed function, or morphological similarity — a fact which Woodbury points out in his concluding section (p. 206). Neverthless, some such conventional grouping would have made for easier use of the report.

The procedure for describing a group of artifacts is relatively uniform throughout the report. A section of general remarks on definitions, nomenclature, and classification is usually followed by a detailed consideration of each subtype in terms of shape, section, surface treatment, variations, special features, or other pertinent information. Size is given by maximum, minimum, and the arithmetic mean, or occasionally by mean only. Analysis by material is followed by provenience according to site and period, and where pertinent, in situ occurrences. A final section is a discussion of the known (as of 1948) development and distribution of the artifact in the Pueblo area, or throughout the Southwest. Where modern ethnographic data are available, the discussion may include extensive analysis of the use of the artifacts described and notes on the cultural dynamics involved in the development, abandonment, or retention of specific types and subtypes. While distributional data are not always exhaustive, they clearly show the general trend through time and space. Much miscellaneous material regarding the various tools is brought together in a most welcome and usable form.

In Part III, "Summary and Conclusions," Woodbury brings some of the foregoing data to bear on several problems. An analysis of Table 19, which details the persistence of Jeddito stone traits and shows the temporal distribution of each artifact type, demonstrates that while few stone implements are serviceable as good chronological markers many serve readily to delineate areal influences. In a short section, "Technics of Stone Artifact Manufacture," he reviews the processes of pecking, abrading and grinding, and chipping, as used in the production of tools in the Awatovi area. The relative importance of these various processes is assessed, and a plea is made for more intensive studies of material culture by ethnologists and for more experimental studies by archaeologists.

In another section, Woodbury formulates a series of functional categories, such as agricultural activity, manufacture of pottery, and housebuilding, under which are listed the various tools from the late Pueblo horizon thought to pertain to those functions. He adds comparative notes for the earlier horizons. This is an interesting and useful formulation and should serve to remind the archaeologist that analysis goes beyond mere description. Finally, he reviews culture change in the area, pointing out the differential rates at which different traits or trait constellations change through time. Woodbury notes that in the Jeddito area, societal traits were modified more rapidly than many material traits and seeks the reasons for these variations.

The chronological placement of rooms and levels at Awatovi and the provenience of artifacts found on floors, in niches, and so on, are given in 2 appendices. The latter serves as a useful reference for artifact association studies. A full bibliography and index complete the volume. Scattered typographical errors occur. Most of these are inconsequential, but a few which bear on interpretation should be noted. On page 48, lipped, full-grooved hammers reported for Jeddito Basketmaker II sites should read Basketmaker III; on page 158, "Legs only slightly separated from body . . ." should be "Head: only slightly separated from body . . ."; and the reference to Stevenson 1833a on page 26 should read 1883a.

In order to assess such a report as this, one should consider both the use for which it was intended and the uses to which it will be put. The treatment of the data curtails their usefulness for the future statistical treatment which Woodbury predicts (p. 201). Measurements are given for whole groups of artifacts only by maximum, minimum, and mean. Woodbury states that it is "impossible and inadvisable" to describe each specimen (p. 11). Perhaps it is impossible, but compare DiPeso's Babocomari and Sobaipuri reports. It would seem both useful and practicable to publish certain basic measurements and other raw data in either tabular or graphic form, especially for those tools intentionally

shaped *for* use rather than *by* use. Furthermore, it is clearly demonstrable that the mean can be a very misleading measurement. Woodbury states that a serious objection to giving only such data is that it fails to make the first step in all science, generalization. However, unless the raw data are available, future and further generalization from other bases or points of view is impossible. It is becoming increasingly clear that to serve the future needs of archaeology, we must solve the problem of publishing the basic quantitative data, not only of provenience and cultural placement, but of all measurable qualities as well.

Nevertheless, taken purely as a descriptive and analytical report for the Southwestern specialist making a routine comparison, or for the non-Southwesternist who wants a general report, this is an outstandingly good monograph. Moreover, its value is considerably enhanced by Woodbury's often penetrating discussions of the manufacture and use of artifacts, nomenclature, time and space distribution, and inferences concerning motor habits and the like. This is the first report on stone artifacts of such scope and thoroughness to appear on the Southwest since Kidder's *Artifacts of Pecos*, which it supplements, amplifies, and brings up to date. Like *Artifacts of Pecos*, it is an indispensable reference book which every Southwestern archaeologist will want to have on his desk.

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Pine Park Shelter, Washington County, Utah. JACK R RUDY. University of Utah Anthropological Papers, No. 18 (bound with Nos. 17 and 19), University of Utah Press, Salt Lake City, 1954. iv + 24 pp., 16 figs. $1.00.

Pine Park Shelter, a small dry cave in southeastern Utah with a maximum of 35½ inches of fill, was cross-trenched by levels in a 1-week field period. The lower stratum, unfortunately called level 1, was composed of loose fill with charcoal flecks and irregular stone fragments. The top stratum, level 2, which averaged less than 6 inches, contained much vegetal debris. Pottery was found in both levels. Nevada Puebloid wares predominated in the lower and non-Puebloid, Southern Paiute, and (possibly) River Yuman wares in the upper. The latter two were about equally represented and made up approximately ¼ the total number of sherds. Rudy points out that if (as he has suggested in No. 12 of this series) the Pueblo occupation terminated around A.D. 1250, then the Paiute were making pottery in the area somewhat earlier. The few perishable materials are adequately described, but it is unfortunate that the 2 "leather" strips were "too dry to be unrolled for analysis," for dampening usually restores a measure of pliability to such objects. Moreover, destruction of any archaeological material, except perhaps fine art work, is of minor importance compared to the information to be gained from analysis. Nearby petroglyphs consist of deeply abraded, irregular, curved lines. Small, shallow, thin slab metates of a transportable size were clustered in lower level 1 and are presumed to have belonged to the Puebloids.

The 210 points and blades were classified primarily according to type of stem and stem-blade size ratio, secondarily according to base and shape of "tang." Rudy uses the word "tang" as a synonym for barb or shoulder; the reviewer does not consider this good usage. He finds the classificatory rubrics satisfactory for the description of a small sample, but hopes that a treatment more consonant with modern typological method will be developed as more work is done in this region. Perhaps Rudy doubted the value of this system for other than descriptive purposes because he did not compute percentages for the artifacts as he did for the pottery. The reviewer's analysis of Rudy's charts indicates that there was a surprising similarity between chipped artifacts from both strata. True, the level-1 people preferred a triangular shape and the level-2 people a leaf-shaped one, but the differences in the stemmed points are probably not significant. If this similarity is real it will be most meaningful when statements are made about the economic structures of Puebloids and Paiutes of the region.

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La Mixteca: su Cultura e Historia Prehispánicas. BARBRO DAHLGREN DE JORDAN. Colección Cultura Mexicana, Imprenta Universitaria, Mexico, 1954. 400 pp.

Archaeological research in Mexico during the last several decades has shown increasingly the importance of the Mixteca in the history of Mesoamerican civilization. Vaillant looked to what he called the Mixteca-Puebla area for the origin of the Aztec ceremonial complex, for instance, and we now think of the Mixtec as being the most advanced people in Mexico in heiroglyphic writing, metallurgy, and the fine arts generally in the period just preceding the Spanish Conquest. The Mixteca comprising most of that portion of the State of Oaxaca lying west of the City of Oaxaca, is little known archaeologically, although the excavations at Monte Alban on its border give us a sequence by which a few known sites more centrally located can be placed chronologically. Much more will be known before long, however, for the Mexican archaeologists are at present vitally interested in the area.

We therefore look upon this study by Barbro Dahlgren as being timely and extremely useful. As thoroughly as can be done in a small book she has gathered together or made easily available all of the historical information from the 16th and 17th century sources that can apply to a description of pre-Conquest Mixtec culture. The book is divided into 4 sections. The first deals with sources, geography, demography, linguistics, and history. The next 3 treat successively of material culture, social and political life, and religion and intellectual life. It is expertly done, for the author is an

experienced anthropologist who is well aware of how her material can be used in further culture-historical research and has presented it accordingly. The book is inexpensively produced and one could have wished for better maps and illustrations. An index should certainly have been included. But these are minor imperfections in what can only be considered an extremely valuable contribution to Mexicanist studies.

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Bibliografia Crítica da Etnologia Brasileira. HERBERT BALDUS. Comissão do IV Centenário da Cidade de São Paulo, Serviço de Comemorações Culturais, São Paulo, 1954. 859 pp. $1.50.

This large volume contains 1785 titles representing all aspects of Brazilian anthropology, of which 13 deal with shellmounds and 45 with other aspects of archaeology. Each entry is accompanied by an annotation varying from one sentence to a page and a half in length. The word "critical" in the title is justified; the author does not hesitate to describe a work as "of no scientific value" when such is the case. The titles cover the entire period from the discovery of Brazil to the present day, and an introduction (in English as well as Portuguese) reviews chronologically the highlights of the development of Brazilian anthropology. Three indices, by subject, by tribal name, and by author, further enhance the usefulness of this work.

While incomplete as concerns the archaeological literature (the reviewer's card file contains over 100 titles on the Amazon alone), the works listed give a good idea of the status of archaeology in Brazil today. Areally, the greatest emphasis is on the Amazon, which accounts for almost two-thirds of the 33 titles dealing with specific regions. Of the remainder, 3 concern the northeast (Bahia, Pernambuco) and 9 the south (São Paulo, Rio Grande do Sul, and Paraná). Content varies from description of individual specimens to reasonably detailed site reports like Goeldi's on the urn burials from Cunany in Brazilian Guiana. The vast majority, however, can be characterized as too incomplete and general to be of scientific value.

This cannot be said in criticism, since much of the recording was done as a spare-time activity by people engaged in other pursuits. Without their interest, we would know even less about Brazilian archaeology. It does, however, reflect against the orientation of Latin Americanists in the United States, who have done almost nothing to foster archaeological work in Brazil. Perhaps Baldus' volume will stimulate interest in this neglected area. If so, he will consider his tedious work well rewarded. In any case, he has performed a valuable service to all those desiring information on any aspect of the aboriginal cultures of Brazil.

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Early Ancón and Early Supe Culture: Chavín Horizon Sites of the Central Peruvian Coast. GORDON R. WILLEY AND JOHN M. CORBETT. With special sections by W. G. Haag, Marshall T. Newman, Lila M. O'Neale, Margaret Ashley Towle, and others. Columbia Studies in Archaeology and Ethnology, Vol. 3 (Institute of Andean Research, Pub. 3e), Columbia University Press, New York, 1954. xix+180 pp., 29 figs., 31 pls., 17 tables, 5 maps. $5.00.

The Chavinoid culture, or Chavín horizon, is the earliest cultural manifestation of any real artistic or architectural significance yet isolated and described in the highly important Andean area. It has been traced or postulated over an area which extends from close to the Ecuadorian frontier on the north to some 200 miles south of Lima, and from the Pacific littoral to the Amazon rain forest. Willey and Corbett undertake a study of the Central Coast portion of this area based on field work at Las Colinas de Ancón and a site near the town of Supe. They provide detailed descriptions of their field work which included stratigraphic cuts, test pits, grave excavation, and architectural exploration. The lack of profiles of the stratigraphic cuts is unfortunate, for it is hard to visualize a deep cut no matter how detailed the verbal description. The maps of the sites are clear and sufficiently detailed. However, since long distance travel is becoming easier every year, would it not be helpful in publications of this sort to map archaeological sites in such a way as to facilitate their location by future visitors? The inclusion in this work of Uhle's old map of Ancón is a case in point. The area has changed so much since Uhle's day that surface reconnaissance from this map is well-nigh impossible.

The ceramics are fully discussed and are illustrated with some of the clearest drawings of pottery yet seen by this reviewer. The typology would be almost too detailed were it not that the authors attempt to trace the development of a single style and to explain its regional variations. The statistical breakdowns accompanying this section are excellent. The authors comment on the scarcity of ceramic spindle whorls and on the resemblance of those found to the pottery technic of Paracas Cavernas. Neither of these facts appear strange to this reviewer. Stone or bone seem to have been most favored for such artifacts at this time, and Cavernas definitely seems to have strong Chavinoid affiliations. What is strange is that more stone whorls were not found. This could well be explained by the fact that the Early Ancón cemetery could not be located in the limited time available for the exploration. A nice feature of this fine descriptive section is the lack of fruitless speculation about many inexplicable artifacts. A distinguishing feature of early Central Coast cultures is the use of potsherds for artifacts whose purpose is unknown. The small, textile-wrapped pieces of corncob are correctly identified as stoppers for ceramic bottles or gourds. Many of them have been found in place in gourds in recent excavations in this region.

There are many controversial points in the summary and discussion of the artifacts. Among these is the problem of the fishing habits of the Early Ancón people. Since Uhle's statement about "primitive fisher folk" it has been the custom to insist upon this activity in spite of lack of evidence. The presence of one fishnet fragment is not conclusive. The reviewer has found graves packed with fishnets in small settlements 25 miles from the sea. On the other hand, the scarcity of fishnet fragments at Las Colinas de Ancón does not prove that the inhabitants of that site were not primarily fishermen. Perhaps they fished without nets. The geographic position of the site lends credence to the "fisher folk" hypothesis. Perhaps when Carrion publishes the details of the excavations at Las Colinas cemetery this point may be resolved. Another instance of the same uncertainty concerns the statement that "wooden objects were widely used by the Early Ancón people." Willey and Corbett found only one wooden object; their statement is based on Carrion's findings. Since she describes mostly ornate grave contents and not everyday objects, it would seem that extensive use of wood has yet to be established. As far as the use of stone is concerned, the abundance of used waterworn pebbles and the scarcity of flaked stone are within the general pattern of Peruvian archaeology. However, the comparative rarity of flaked stone tools may well be due to a lack of field research to establish the Peruvian types for such implements. Frederic Engel of the Société des Américanistes is now carrying on such research in the region between Lima and Paracas.

The similarity between the basketry at Ancón and Supe together with other similarities between the sites would certainly indicate a cultural linkage. But unfortunately, twined baskets of the type illustrated can no longer serve as general chronological markers in the region. They have been found in grave association with Playa Grande (Interlocking), Maranga (Proto-Lima), and Coastal Tiahuanacoid. The textiles, metals, plant and animal remains, and skeletal material are described by a group of specialists. These sections are uniformly excellent and packed with interesting material. This type of presentation could well serve as a model for future studies. In South American archaeology especially, we have become accustomed to having to wait some years before the several aspects of any given piece of field research become available for study. Willey and Corbett give the entire picture in one volume, a most welcome and gratifying change.

The relationship of the 2 excavated sites to each other and their place in Peruvian prehistory as a whole are discussed in the concluding section. The authors are to be congratulated for the emphasis which they place on possible regional variations in the ceramics of a single style or period. It would appear logical to assume this variation, especially for the early stages of Andean culture history, but heretofore it never seems to have been sufficiently well pointed out. One interesting point in the discussion of the nonceramic finds is the absence of wooden or bone weaving tools, although textiles were encountered in fair profusion. Another is the section on one of the expedition's outstanding discoveries, a magnificently carved and painted gourd of definitely Chavinoid style in the classic coastal manner. This gourd is one of the most important artifacts of this early period yet found.

The authors carefully review the Chavinoid style as a whole and the sites in which it has been found. At the time of writing no Chavinoid sites had been encountered between Supe and Las Colinas de Ancón. In 1952 Richard P. Schaedel found Early Ancón sherds at Cerro de la Trinidad in the intervening Chancay valley. Other sites will probably come to light. The sites of this period are generally small and unimposing so it is not strange that some were overlooked in the earlier days of Peruvian archaeology when the emphasis was on exploration of the many larger and more impressive sites. The authors anticipate both this observation and Schaedel's find. They also shed further light on the incised pottery found at the Teatino site and called Chavín or sub-Chavín by Tello. Kroeber, in *Peruvian Archeology in 1942*, first cast doubt on the Chavinoid affiliations of the Teatino style, relating it to the Tiahuanacoid I-associated Middle Ancón I. Subsequently, this same pottery has been found at Ancón in direct grave association with classic Coast Tiahuanacoid and decadent Maranga (proto-Lima), and observed in the Rimac valley in graves intrusive into non-Tiahuanaco-influenced Maranga architecture. This should make it plain that all incised pottery styles are not Chavinoid in time, although they may have their stylistic antecedents in the Chavín horizon.

There is a good discussion of the differences between Central and North Coast Chavinoid, the latter being the Cupisnique of Larco. The high incidence of modeled ware and other more complicated forms in the Cupisnique style is noted. A subject for future study is the range exhibited by the North Coast emphasis on modeled ware in pre-Tiahuanacoid Peru to the virtual exclusion of the polychrome technic, while exactly the reverse is true for the South Coast. The Central Coast partakes in almost equal measure of both traditions. The authors also comment on resemblances between Formative cultures, in Peru such as Chavinoid, and comparable ones in Mesoamerica. These resemblances are sometimes striking, but care must be taken in comparing very early cultures for sometimes their similarities may be due to simplicity, comparable stage of development, or availability of materials. This section is followed by a restatement of Willey's admirable interpretation of the spread of the Chavín culture.

Willey and Corbett give a sound and clear reconstruction of the Ancón-Supe culture. They point out an important, but little-known, fact in emphasizing the amount of trade between geographical areas in very early times. Some of their conclusions about the chronological relationship of Supe to Ancón appear to be overstated in the light of the available evidence. However, this evidence is set forth in such a way that the reader may form his own opinion. The authors con-

clude with suggestions for future field work which may resolve further problems connected with the Chavín horizon. The book is well organized and presented, but as in the other publications in this series the reproduction of photographs of sites and sherds leaves something to be desired. Willey and Corbett have made a fine contribution to our knowledge of a most important and little known epoch in Peruvian prehistory, and their book should be in the library of every Peruvianist.

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Photography for Archaeologists. M. B. Cookson. With a Foreword by Sir Mortimer Wheeler. Max Parrish, London, 1954. 123 pp., 13 pls. $3.00.

This concise little book is packed with useful information, well fulfilling the author's purpose of placing "in the hands of Site Supervisors [dig foremen] and students a simple approach to photography as applied to archaeology." Cookson devotes 12 of the 20 chapters to field problems and the way in which he has met them. He emphasizes the kind of architectural archaeology which is prominent in the Old World, but the information he gives is applicable to all kinds of archaeology, even that which overlaps with geology. Some of Cookson's field practices will seem strange to other photographers, and some of his terms, such as balk (trench wall) and turves (old ground surfaces), may send others to the dictionary as they did me. However, the book is easily read.

Cookson demonstrates that photography is an essential part of every archaeological dig and that it is a full time task for one person. He points up the need for cleanliness in the preparation of features for photography, and emphasizes the necessity of using a large camera for record photography while restricting the 35 mm. camera to color slides. The balance of the book is largely technical. While the author states that this section "was never intended to be technically exhaustive," he might have made it more useful to the experienced photographer interested in archaeology by the inclusion of charts and tables. References to standard photographic publications would have given the beginner much essential data. While photography cannot be learned by reading about it alone, such publications are valuable to both the beginning student and the experienced worker.

Chapter 13 is devoted to the photography of artifacts in the field, with Chapter 18 covering studio practices. An entire book could be devoted to this single aspect of archaeological photography. Few will agree with the author when he condemns the use of opaqued backgrounds. A perfectly white background can be obtained with the use of the shadow box, but the background will print gray when reproduced by halftone unless it is mechanically removed in the plate — an expensive process. If the reproduction is to be without background, as is common in various offset processes, then the photograph is best made with a grid of visible lines which are readily removed to give a clear background. Better still, use a good line drawing. This book is highly recommended to everyone concerned with archaeological excavation and recording, and to anyone seriously concerned with photography. The 13 pages of photographs adequately illustrate the text and well demonstrate the author's mastery of his craft.

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NOTES AND NEWS

EDITED BY CLEMENT W. MEIGHAN

EARLY MAN

The Tule Springs site in southern Nevada has recently received renewed attention by students of early man in America because of a radiocarbon age determination of "more than 23,800 years." M. R. Harrington, Curator of the Southwest Museum, Los Angeles, has prepared the following background material on this important site at the request of the Assistant Editor for Early Man.

Fenley Hunter, representing the American Museum of Natural History, first discovered the Tule Springs site while on a paleontological reconnaissance of Pleistocene deposits in Vegas Wash, in 1933. He found an ash bed exposed by erosion, which contained charcoal and mixed bones of camel, bison, deer, horse, and mammoth — all of extinct Pleistocene species. Many of the bones were broken and split, and some burned. Among them was an obsidian flake, obviously struck off by man, showing signs of use. Hunter removed a block of the matrix containing the flake, together with bones and charcoal, and took it to the American Museum of Natural History. The flake was removed there in the presence of several scientists, and George Gaylord Simpson published the find in 1933 as "A Nevada Fauna of Pleistocene Type and its Probable Association with Man" (*American Museum Novitates*, No. 667).

The site was then turned over to the Southwest Museum and Harrington spent some time on the ground. A series of similar ash beds was found about ½ mile northwest of the original find, and a number were excavated, yielding similar bones and charcoal, among them ash dumps where camp refuse had apparently been thrown into holes. In one of these was a camel foot, seemingly hacked off and thrown away, the only articulated bones found. In the vicinity of the ash beds and on the same level were found several crudely made stone implements, including a large uniface scraper, a biface chopper, and a disc-shaped biface implement, on all of which the chipped portions showed the same patination as the original surface. The ash beds also yielded 2 bone artifacts and part of a third — splinters from the leg bones of large animals which had been smoothed to an awllike tip at one end. A brief report by Harrington entitled "A Camel-Hunters' Camp in Nevada" appeared in *The Masterkey* in 1934 (Vol. 8, No. 1, pp. 22-4).

Upon receiving Libby's age determination of "more than 23,800 years" on 2 samples of charcoal from these ash beds, Harrington reported the dating in *The Masterkey* in 1954 under the title "The Oldest Campfires" (Vol. 28, No. 6, pp. 233-4).

In May, 1955, a party from the Southwest Museum revisited the site and excavated more similar ash beds, including what appeared to be a fire pit where a camel had been cooked and eaten. One bone showed distinct marks of scraping; many had been split when fresh to extract the marrow; and others showed burning. Another biface, disc-shaped, chipped artifact of stone was found associated with bones by this expedition, and what appears to be a crude side scraper — an elongated pebble chipped along one edge.

Ruth D. Simpson, Assistant Curator, found a large part of the disarticulated skeleton of a mammoth at some distance from the main site. Near its skull and on the same level was a small bed of charcoal, suggesting a fire of contemporary human origin.

Several other organizations were represented in this party. Harrington and Simpson were joined by Stuart L. Peck of the Archaeological Survey Association of Southern California, Charles Rozarie of the University of California at Los Angeles, and Mr. and Mrs. S. M. Wheeler of the Bowers Memorial Museum of Santa Ana.

It may be concluded that the Tule Springs site was a campground of early man on a series of low clay knolls, on the banks of a stream in what is now a barren, waterless desert. Here the animals which had been killed for food, or parts of them, were brought in, cooked, and eaten. The long bones were broken and split for the marrow. The commonest animal was a large American camel (*Camelops*), while less common were a long-horned bison, one species of deer, 2 species of American horse, and the mammoth.

We do not know how these animals were captured, but it is interesting to note that the bones studied at the American Museum showed the animals to have been, in the main, very young or aged when killed. That sharp flakes were used for cutting is shown by the obsidian flake found by Hunter; also several crudely chipped stone scrapers and choppers or "hand axes" were found. Crude but distinctly worked pointed bone tools, probably of camel bone, show that this material was used for implements too.

The main campground measured some 625 feet long and 200 feet wide. The site where Hunter made his first discovery, about ½ mile southeast, was similar but smaller. A few scattered ash beds have been noted elsewhere in the same area.

Perhaps only a short time after these campgrounds were abandoned, a lake formed in this part of the valley, covering them completely, as testified by shells of small mollusks occurring abundantly in and directly on top of the ash beds. The lake (or lakes) probably eventually filled the area with silt containing shells to a depth of 21 feet over some of the ash beds. Over the higher knolls this silt is usually 14 feet or less in thickness. After the last lake had dried, erosion began, eventually exposing once more parts of the campgrounds and ash beds.

The geological story has not been worked out in detail, but Harrington suggests the probability that the above-mentioned lake (or lakes) existed during the "Great Pluvial," and evaporated during a long dry period which followed.

PACIFIC COAST AND GREAT BASIN

CALIFORNIA. The University of California Archaeological Survey has been conducting an excavation in the Monticello Reservoir area, Napa County, under a contract with the National Park Service. A large site (Nap-93) was selected for primary investigation with the expectation of recovering historic material which would confirm the location of the historic Patwin village called *Topai*. Although no historic artifacts have been found to date, tentative evidence of stratification has been disclosed, probably ranging from the Middle horizon of Central California to the latter part of the Late horizon. A. E. Treganza, J. A. Bennyhoff, and A. B. Elsasser have been in charge of field operations.

Plans for the summer included survey and excavations in Mono, Alpine, Shasta, and Napa counties. Survey in the vicinity of the West Walker River, in Mono County, and the area to the north, in Alpine County, was for the purpose of ascertaining the southern extent of the so-called King's Beach and Martis cultures. Several sites in Napa County have been scheduled for excavation which might lead to fuller knowledge of stratification problems, including the relation between an earlier lithic culture which does not include heavy use of obsidian and the later, protohistoric cultures which predominantly employed obsidian as implement material.

William J. Wallace, University of Southern California, reports intensive salvage work at the important Malaga Cove site in Torrance, California. This site, previously described by Edwin F. Walker (*Five Prehistoric Archaeological Sites in Los Angeles County, California*), was leveled to make way for a housing subdivision. University of Southern California graduate students with some assistance from University of California at Los Angeles students, the personnel of the Los Angeles County Museum, and the Archaeological Survey Association of Southern California did the excavating. An effort was made to obtain materials from the lower 2 cultural levels (Walker describes 4 for the site), and a fair number of artifacts and a single flexed burial were uncovered. Wallace states that his findings agree, in general, with those of Walker. The Malaga Cove site was a key site for southern California archaeology, and it is unfortunate that it was destroyed without a full-scale excavation being undertaken.

The Southwestern Anthropological Association held its annual spring meeting on the University of Southern California campus. A number of papers dealing with the archaeology of California were read. William J. Wallace was elected President for the coming year.

Phil C. Orr of the Santa Barbara Museum of Natural History spent part of the spring and summer working on sites on Santa Rosa Island, and later, with George Carter of The Johns Hopkins University, investigating deposits of Wisconsin age in the Lake Lahontan area of Nevada, Santa Rosa Island, and southern California.

MONTANA. David Larom and Marshall Sullivan, under the direction of Carling Malouf, have completed a preliminary survey of the Flathead River in western Montana from Dixon to Paradise. This area may be inundated by the proposed Paradise Dam project. It was the territory of the Upper Pend d'Oreille in late prehistoric and historic times. Eight sites were located, producing only a minimum of surface finds. Of particular interest was a circular stone "fortress" which was located on the highest point of Dixon Mountain. Upon excavation it yielded a few small chips and flakes. Due to its wind-blown exposure, lack of water supply, and similarity to other known ceremonial structures in western Montana, it is thought to be of religious rather than military significance. Of the 7 remaining sites, 6 are occupational and one is a sweat lodge area which had apparently been in use within the last 25 years by Pend d'Oreille Indians. All of the sites are located at the mouths of major streams entering the Flathead River.

WASHINGTON. Bruce Stallard, under the direction of Douglas Osborne of the University of Washington, spent a part of the summer making an archaeological survey of the west coast of the Olympic Peninsula. This is a project sponsored by the National Park Service and is a part of their survey of the Olympic National Park directed toward better development of its resources for recreational attractions.

B. Robert Butler, also under Osborne's direction, supervised continued excavations at the Wakemap mound on the Columbia River. This excavation was a cooperative project, with the University of Washington furnishing the direction as well as some financial assistance, the Oregon Archaeological Society furnishing the labor, and the Dalles Chamber of Commerce and the committee for the establishment of a museum at The Dalles furnishing most of the financial support.

In July, George L. Coale and a small crew of students conducted historic archaeological research at Fort Simcoe on the Yakima Indian Reservation. The principal problem was to outline the old buildings of this early western fort.

BRITISH COLUMBIA. Charles E. Borden of the University of British Columbia reports that with a small crew he spent the late spring and early summer conducting final salvage excavations at the Marpole site in Vancouver. A number of finds of special interest were made: new forms of harpoons, some bilaterally barbed and one with a central line hole, T-shaped labrets, and a bone implement with the handle carved in the form of a waterbird. Borden also excavated 2 burials and discovered a portion of a large house with an extensive hearth area and 2 probable postholes.

UTAH. Jesse D. Jennings conducted an archaeological field school with a crew of 8 in the vicinity of Salina and Emery, from June 11 to August 1. His assistant in the field was Dee C. Taylor, a graduate student at the University of Michigan.

James H. Gunnerson, Field Director of the Statewide Archeological Survey, continued archaeological reconnaissance in eastern Utah, north of the Anasazi area. The survey continued through August.

Both the field school and survey activities are focused primarily on the Fremont problem.

SOUTHWEST

ARIZONA. The University of Arizona, Department of Anthropology, and the Arizona State Museum have completed the 10th annual field session at Point of Pines, under the direction of Emil W. Haury. Twenty-one students from 5 universities and from one foreign country, excavated in the large pueblo ruin and in a nearby pit-house village.

Kenneth M. Stewart of the Arizona State College at Tempe, reports that they have completed the first season of digging at Mesa Grande near Tempe. This is a Classic period site in the Hohokam area.

The University of Illinois, and the Museum of Northern Arizona, at Flagstaff, sponsored an archaeological expedition from June to the middle of August. Excavations begun in 1953 at the Pollock site, 40 miles southeast of Flagstaff, were continued. Seven students, under the direction of John C. Mc.Gregor, of the University of Illinois, and William Beeson, graduate student at the University of Arizona, dig foreman, made up the crew.

From Pueblo Grande Museum in Phoenix comes word that the Casa Grande-type ball court at Pueblo Grande is nearly completed. It will be part of a permanent exhibit at this museum.

Albert Schroeder, reporting for the Southwestern National Monuments, says that Lee Abel, archaeologist at Casa Grande, was loaned to the Museum of Northern Arizona for a week in April to assist in the excavations and tests of a few historic sites on the Walapai Indian Reservation.

The natural gas line being laid down by the Southern Pacific Company, running from El Paso to the California border, has had during the summer, several teams surveying along the right of way. Five students from the University of Arizona participated in the survey.

NEW MEXICO. Channing Howell, Superintendent of Gran Quivira National Monument, spent the month of May at El Morro, recording photographically all of the inscriptions on "The Rock." Superintendent Irving McNeil, of El Morro National Monument, is now making a systematic index and study of the both historic and prehistoric inscriptions. Richard B. Woodbury of Columbia University and Nathalie F. S. Woodbury of Barnard College continued archaeological work at El Morro, where they excavated in the south ruin last year. Clearing of a circular kiva was completed and the remainder of the summer spent on analysis of the ceramic material from both seasons, particularly the glaze wares. The 11 rooms excavated in 1954 were stabilized last spring by Gordon Vivian of the National Park Service, and will be a permanent archaeological exhibit.

Charlie Steen, of the Region Three Office of the National Park Service, carried on salvage excavations during the spring at a small site near Clayton. He found considerable burnt bone and a few artifacts, largely representing an early occupation. A preliminary report is being published in *El Palacio*.

COLORADO. The joint report of H. M. Wormington, Denver Museum of Natural History, and Robert H. Lister, University of Colorado, entitled *Archaeological Investigations on the Uncompahgre Plateau* went to press in July.

Robert H. Lister conducted the University of Colorado's 8th annual field session at Mesa Verde, with 15 students excavating a Pueblo III mesa-top site. Lister has a leave of absence for 1955-56 to complete archaeological reports on Chihuahua and Mesa Verde and to continue field studies in northern Mexico.

Joe Ben Wheat of the Colorado State Museum at Boulder reports that the museum is now exhibiting Earl Morris' Basketmaker II material from Durango. During May Wheat excavated a Basketmaker III site near Yellow Jacket; 6 structures were dug, 3 of which were granaries, 1 apparently a kitchen unit, and 1 a small antechamber pit-house. The other unit was a great kiva. Wheat ran an archaeological survey along the rights of way of several uranium access roads near Moab, Utah; 5 surface sites of the preceramic Fremont culture were found.

Herbert Dick, Trinidad State Junior College, reports that the Archaeology Department is holding its 2nd field school session. With the aid of the Harvard Botanical Museum a research camp is being built on Trinchera Creek, 30 miles east of Trinidad. It is hoped that at least 5 years of research can be undertaken in this area on prehistoric contacts of Plains and Pueblo cultures.

UTAH. The University of California at Los Angeles conducted its summer field program in southern Utah in June and July, continuing investigation of Peripheral Pueblo sites. A crew of 17 under the direction of C. W. Meighan participated in the work, which was concentrated at the site of Paragonah. Some evidence was obtained to show that the Paragonah site was peopled by migrants from the Southwest, rather than by a Basin people who adopted Pueblo agriculture.

PLAINS

Carling Malouf of the University of Montana reports plans for pipeline archaeology in southeastern Wyoming, through the cooperation of Jesse Nusbaum, National Park Service, and the Colorado Interstate Gas Company. William Mulloy, University of Wyoming, will assist in the survey.

Carlyle S. Smith of the University of Kansas excavated during June and July on the Crow Creek Reservation, near Chamberlain, South Dakota.

NORTHEAST

ONTARIO. Kenneth Kidd conducted an archaeological reconnaissance in the area from the Lakehead and the Manitoba border. This work was made possible through the generosity of the Quetico Foundation of Canada. This year preliminary observations were made along the old fur trade routes for Indian campsites, trails, and other remains. Extensive use of ethnohistorical sources

was made. It is thought that this area may provide important clues to the development of the Woodland cultures as well as its antecedents. Settlement and the development of hydroelectric projects in the Northland generally make immediate study imperative.

Plans to plot and survey the remains of a fish weir near Orillia, Ontario, have been made. This structure was in use on the very first visit of white men to the area for Champlain remarks upon it. It was thought that most of it had been destroyed in building railroad bridges and dredging the channel, but a diver has recently found many of the stakes.

The Sheguiandah Site was subjected to the scrutiny and examination of Pleistocene geologists. During the past summer, Thomas E. Lee with a small party from the National Museum of Canada made excavations in places on the site which would yield geologic evidence.

Frank Ridley of Toronto, renewed his search, along the Ottawa-James Bay canoe route, for a stratified site which will index the Lake Abitibi material found in 1954. Concentrating on the Lake Abitibi area he checked the western end of the lake and the lower Abitibi River. More extensive excavations were conducted at the site in Ghost River on the lake and at the Montreal River site. This work will provide data bearing on the early northeastern boreal occupations and their relationship with certain early Arctic cultures.

During the spring, Douglas Clarke, Toronto, located 2 prehistoric Iroquois sites east of Toronto. These are on the Barrie-Uren level of ceramic development. Test excavations by Clarke and Ridley provided much material which demonstrates the difficulty of attaching historic tribal identities to prehistoric Ontario pottery.

Paul Sweetman reports salvaging some material from an historic Indian cemetery on the north shore of Lake Kashagawigamog, Haliburton County, Ontario. Bulldozing operations had badly mutilated most of these, but 3 relatively undisturbed burials were excavated by him. Covering 2½ acres, this site has yielded materials considered typical of Laurentian, Lalonde, and historic peoples.

Sweetman also reports having examined or partially excavated 2 sites in Peterborough County, Ontario. One, on the Ouse River, yielded a Point Peninsula type of rocker-stamped pottery. The other is a manifestation of a prehistoric Iroquois (Lalonde?) culture. In the Lake Simcoe area, he examined a large village site at Beaverton which produced dentate-and rocker-stamped pottery.

NEW YORK. The Nichols Pond site in Fenner Township, Madison County, was investigated during July under the sponsorship of the Champlain-Oneida Battle Park Association. With funds provided by Madison County, a party of 5 headed by Peter P. Pratt conducted the investigation under the general direction of William A. Ritchie. Further evidence bearing on the long disputed problem of whether or not this was the site of Champlain's attack on the Iroquois of central New York in 1615 was being sought.

The Geneva Mound, on the site of Kanadesaga, a Seneca village destroyed by General Sullivan in 1779, was excavated by William A. Ritchie and William H. Sears. Now in Geneva, New York, the mound is to be destroyed by building developments. This was excavated with the expectation of finding numerous historic period Seneca burials and the hope that it was originally a Hopewellian mound. Few untouched Hopewellian mounds remain in New York and there is still no radiocarbon date for this cultural manifestation in New York State.

Near Fonda, work on the Caughnawaga site (historic Mohawk) was continued. Additional work near Fonda was done by members of the Mohawk-Caughnawaga Museum and the Van Epps-Hartley Chapter, New York State Archaeological Association. They investigated a prehistoric Mohawk site known as the Chapin site.

Father Thomas Grassmann also reports that the major exhibits in the Mohawk-Caughnawaga Museum, Fonda, are being rearranged. The sequence beginning with the Castle Creek Focus and passing through 8 periods to late Colonial Mohawk (1666-1693) will be presented. This will include artifacts, notations pertaining to the people, their villages, livelihood, burials, and maps.

CONNECTICUT. The New Haven Chapter of the Archeological Society of Connecticut continued its excavation of the Grannis Island site.

Mr. Robert C. Suggs, an anthropology graduate student at Columbia University, is digging the Manakaway site at Greenwich Point. This site is fortified with an embankment and appears to be protohistoric in age. It may turn out to be related to Fort Massapeag on western Long Island.

PENNSYLVANIA. John Witthoft reports that the Pennsylvania State Museum and the North Museum of Franklin and Marshall College (Lancaster) began joint excavations on the Al Eybaugh property at Washingtonboro, Pennsylvania. This excavation is of a Susquehannock cemetery, a part of the Washingtonboro site of 1600-1625. At least 34 graves have been excavated. These contained the burials of 40 adults and adolescents and about 25 infants. No infant burials have been found in separate graves. All had been included with adults. Due to poor bone preservation in part of the site, the number of infants is uncertain, since in some cases more than one set of tooth caps occur in the same location. Usable adult skeletal material has been found in 10 of the graves, and represents the Sylvid-Lenapid physical type of normal, small stature which is usual in this region. With one exception, a burial following violent death, all graves have included both grave furniture (pots, iron axes, 1 brass kettle, pipes, a brass pipe of churchwarden form) and ornaments from clothing. These graves, with the one exception, have included European beads of the same series as was found at the Seneca sites, Dutch Hollow and Factory Hollow. The graves had been dug with iron hoes. The findings provide new information on Susquehannock archaeology. They differ from that provided by the older formal literature on this subject.

The prospect of continued work on the Eybaugh site, or any archaeological work, is uncertain insofar as the participation of the Pennsylvania Historic and Museum Commission is concerned. In January, 1955, the budget of this body was cut by its own administrative officers. As a result, a large part of the employees of the Commission were discharged. Funds for their salaries and most other committed and all uncommitted monies standing at the credit of the Commission were declared unneeded and were turned back to the treasurer's office. The appointment of a new Commission should restore some stability to the situation, but delays in these appointments suggest that both budget and staff will be subjected to still further precedent-setting acts before a settled condition is reached.

William J. Mayer-Oakes reports the major field work of the Upper Ohio Valley Archeological Survey (Carnegie Museum, Pittsburgh) was the excavation of an early Historic Monongahela Village site in Greene County, Pennsylvania, near Waynesburg. This was the first systematic excavation of a contact period site in the Upper Ohio Valley. This should provide information on the nature and development of the final stages of Monongahela culture.

The UOVAS also continued the investigation of the Cheat River area with a two-week excavation of a rock shelter in West Virginia. Preliminary indications are that an Archaic unit is present with a thin overlay of ceramic materials. The party conducting this investigation consisted of Don W. Dragoo, Jack Leppla, and Mr. and Mrs. Albert Bauer.

Massachusetts. During the summer season, the Cohannet Chapter of the Massachusetts Archaeological Society continued its investigation of a site at Assawompset Lake in Middleboro, Massachusetts. Maurice Robbins reports that this is the site of the historic village of Tuspaquin or the "Lake Sachem of the Wampanoags" as he was called by the English. This is a stratified site yielding evidence of occupation since the Archaic.

Burials of the historic period have been found in Swansea, Massachusetts. Present evidence suggests this was an ossuary. Maurice Robbins hopes to conduct a more complete investigation of this in the near future.

New Jersey. The New Jersey State Museum has conducted a brief survey of recently reported sites in the state. The field work was conducted by Donald Hartle of Hunter College. Some test excavations were carried out, one on a stratified site near the Pine Hill site in Camden County. Dorothy Cross reports the presence of "a late Archaic horizon, an Early Woodland with steatite-tempered pottery, a very weak Middle Woodland, and a strong Late Woodland, containing pottery which helps to bridge the gap between Witthoft's Overpeck Incised and our Riggins Fabric-Impressed."

SOUTHEAST

Florida. Florida State University: The summer school of the Department of Anthropology and Archaeology spent the summer excavating in a Weeden Island II burial mound on Ocklochonee Bay, near C. B. Moore's Nichols Mound. Hale G. Smith and C. Fairbanks were in charge.

Florida State Museum: W. H. Sears joined the staff in July as Assistant Curator of Social Sciences under R. P. Bullen, Curator. This increase in staff will permit expansion of the museum's work in Florida archaeology and history.

Georgia. Etowah: The University of Georgia field party, supervised by A. R. Kelly and P. Smith, continued excavations near Mound B. L. Larsen conducted further excavations for the Georgia Historical Commission.

Columbus Museum of Arts and Crafts: This organization sponsored exploratory work at the Ruud Plantation site, on the Chattahoochee, 40 miles south of Columbus, during the summer. J. R. Caldwell supervised. Excavations in the main temple mound have revealed superimposed structures accompanied by "Lamaroid" pottery.

New Echota: Final work in the summer of 1955 was intended to discover the ground plan for the Court House and other official buildings. This information, with that already on hand for the commons, road system, council house, the "Cherokee Phenix" print shop, and other structures, will enable the restoration of the village. C. De Baillou was in charge.

Fort Mountain: A. R. Kelly conducted a survey of Fort Mountain State Park and adjacent areas in July.

Louisiana. W. McIntyre's dissertation, "Correlation of Aboriginal Settlements and Mississippi River Deltas" will be published in the fall as a Louisiana State University Faculty Study. Data on the distribution of Weeden Island series and complicated stamped ceramics in southern Louisiana are included.

North Carolina. W. Haag of Louisiana State University carried out a second season of survey for the National Park Service during the summer. This was part of a total study of these offshore islands which includes their geology, cultural geography, and botany. Sites are scarce due to a constant erosion and deposition cycle which is moving the island toward the mainland. The culture sequence, with fabric-marked, cord-marked, and simple-stamped pottery, indicates that connections were to the north.

Historical material of the 17th and 18th centuries has been found in some quantities. Correlations with Williamsburg and Jamestown are hoped for.

Virginia. John L. Cotter, supervising archaeologist for Region I of the National Park Service, reports considerable activity at Jamestown. Archaeological explorations, undertaken by the Park Service in co-operation with the Virginia Jamestown Commission and the Federal Jamestown-Williamsburg-Yorktown Celebration Commission, have produced a number of new discoveries which improve the historical perspective of the first permanent English settlement in North America.

A party under the direction of Joel Shiner (now Archaeologist, Ocmulgee National Monument) com-

pleted explorations on the grounds of the Association for the Preservation of Virginia Antiquities which led to several discoveries. 70 burials were found beneath and around the foundations of the Third Statehouse on a ridge some 300 feet northeast of the presumed first settlement location of 1607-1610. When the Third Statehouse was built in 1665, it can be assumed that the cemetery had been forgotten.

A second discovery was the location of an early 17th century armorer's forge in the central area of a Confederate earthwork, on the approximate location of the original settlement. At least 8 sword hilts, dating from the first quarter of the 17th century, and a number of gun parts indicated the spot where the early settlers sought to maintain and improve their arms.

An incidental but important discovery was that of an Indian occupation level immediately beneath the 17th century horizon of European occupation. Over 300 sherds plus a good representation of lithic artifacts makes this one of the rare opportunities in Virginia of analyzing traits from a known, specifically dated, Indian group.

A second crew under the direction of Edward Jelks and John Cotter continued explorations in the "James City" area. The number of structures of all types now totals 118. Recent discoveries include a row house 170 feet long and several smaller brick structures. A number of property line and drainage ditch locations are expected to contribute to the knowledge of 17th Century Jamestown.

Louis R. Caywood has completed his report on explorations at Greenspring, the 17th century plantation residence of Governor Berkeley near Jamestown Island on the York peninsula. The work was done by the National Park Service for the Virginia Jamestown Celebration Commission. The report is being multilithed by the Service for the Commission.

MIDDLE AMERICA

In an attempt to coordinate and focus the research activities of archaeologists, ethnologists, and social anthropologists at Harvard on Middle American anthropology, a committee has been formed, consisting of Gordon R. Willey, Evon Z. Vogt, and J. O. Brew. It is the purpose of the Committee on Middle American Studies, Peabody Museum, to initiate and carry through research programs on a series of broad problems in the Middle American regions. Two such problems are settlement patterns and their implications and the native food complex and all of its interrelated ramifications, both on the prehistoric and modern levels. It is the further aim of the committee to place graduate students into the field in connection with these research problems and to support a modest publication program in Middle American anthropology. The committee will be cosponsored by the Laboratory of Social Relations.

Mexican Plateau. At La Victoria, Tlatilco, excavation was renewed by Piña Chan and a number of new burials have been uncovered. At Tlalpan, D.F., José Gorbea has uncovered a late Aztec site. A good number of factors have been responsible for the destruction of archaeological sites; a new element has been introduced at Teotihuacan, where the small upper platform of the Pyramid of the Sun was damaged by an airplane colliding with it. The damage is being repaired. José Corona Nuñez has discovered and is repairing a large pyramid at Loma de Ixtepete, near Guadalajara.

At Tamuin, San Luis Potosi, Rafael Orellana, of the Instituto Nacional, found east of the Edificio de Pinturas the burial of a child with typical Panuco V pottery and copper bells, some of which were attached to a small fragment of cloth. This rarity in Middle American archaeology is being studied by Irmgard Johnson.

Oaxaca. Students of anthropology from Mexico City College have continued work at Yagul, situated on a hill-about 3 miles from the modern town of Tlacolula. This proves to be almost a twin of Mitla. The finely cut mosaic stone work on the outsides of the buildings has fallen, but the work of trying to fit together the stones in order to reconstruct the geometric patterns has now begun. Yagul, unlike Mitla, has a ball court, and this overlies 2 earlier courts. Several cruciform tombs of the kind made famous by Saville have been found.

Veracruz and Gulf of Mexico. Eduardo Noguera made an inspection and survey of sites in the Papaloapan basin, and visited the sites of Tuxtepec, Chiltepec, and Valle Nacional. Work at Pueblo Viejo has started under Licenciado Juan Valenzuela. Alfonso Medellin, of the Department of Anthropology of the State of Veracruz, is making a survey of Chicontepec and the surrounding country. Dr. Waldtraut Hangert, of Germany, is excavating at Santa Cruz Juarez.

At Tenanquililcango, 14 km. from Chicontepec, Medellin reports 30 platforms and pyramids, the former up to 30 m. long. In the area between one platform and 2 small pyramids a cemetery was located, but all the burials were without skulls. The skulls were found in jars in the adjacent pyramid. This excavation produced classic pottery, but in the region all phases from Panuco I to Panuco V are found. At Camitlan, about 40 km. away, over 30 mounds were found. These included a ball court, pyramids, and platforms up to 40 m. long.

Philip Drucker, of the Bureau of American Ethnology, and Eduardo Contreras, of the Instituto Nacional de Antropologia e Historia, have carried on joint excavations at La Venta. Half a dozen important sculptures were unearthed. These include a large sculpture of a seated human figure, another colossal head, and representations of monsters, jaguars, and birds, all of La Venta style. The clearance of the ceremonial court involved the removal of about 800 cubic meters of debris and nearly 100 tons of columns.

Maya Area. The third season of the Belize Valley expedition of Peabody Museum, Harvard, was in the field from January to May. Gordon Willey was assisted by graduate students William Bullard, Jr., John Glass, and Philip Orcutt. Work was again concentrated at

Barton Ramie, about 7 miles northeast of El Cayo and some 3 miles downstream from Baking Pot. Many house mounds were tested for occupational periods, bringing the number thus examined to 39, apparently well over 10% of all house mounds at the site. Ceramic materials similar to those of the Mamom (Formative) phase were found at Barton Ramie for the first time this year, but as yet there is no evidence of a post-Classic occupation. One house mound, excavated in great detail, had been occupied from late Formative (Chicanel) to late Classic. Present information, beyond revealing a large domestic settlement group of some 300 houses, throws little light on the complex problem of settlement patterns in the Belize Valley. It is hoped in 1956 to extend surveys and test excavations to cover the whole valley from Roaring Creek to the Guatemalan border. This should indicate the size and grouping of domestic sites, their relationships to ceremonial centers, and their occupational spans.

Carnegie Institution of Washington completed the fifth and final season of excavation at Mayapan. The staff this year included Ann Chowning, Robert Temple, and Donald Thompson as student archaeologists. Emphasis was on domestic rather than religious structures, but an exception to this was the work of Ann Chowning and Don Thompson at Itzmal Ch'en, an outlying ceremonial group within the great wall, which may have been a "barrio" religious center. The most interesting structure was a round building, at the base of which, in a small shrine was found a stucco representation of the diving god. This was in situ flat on the floor. Nearby, the chief temple revealed what seem to have been Atlantean figures on the front of an altar. If the identification is correct, these are the first Atlantean figures found at Mayapan. Further work on residential structures was rewarding. By and large it is becoming increasingly clear that the rulers of Mayapan devoted the best workmanship to their own residences. This priority of lay interests over communal religion is highly significant. In one large residential structure a kitchen, with hearth in position, was excavated. Here a number of huge, but very badly smashed, storage jars came to light.

The season's work yielded an increasing number of representations of turtle, in stone and pottery, some of which hold the heads of gods in their mouths. Clearly, the turtle, which in present-day Maya folklore is associated with rain, was the object of an important cult.

Karl Ruppert and Ledyard Smith examined house mounds at the walled city of Chacchob. Ceramic evidence now shows the city to have been occupied in the Mayapan period as well as that of Puuc architecture and ceramics, as previously indicated.

William Sanders, with a Carnegie Institution fellowship, continued his survey of the east coast of Yucatan, with particular attention to Tancah, Tulum, and Ichpaahtun. The first of these had its main occupation in late Classic times; the other two are primarily Mayapan period. This is of interest because each site has produced a stela of early Classic period, and each site is walled, a feature believed to have been typical of the Mayapan period. Sanders also found an East Coast red ware which rather closely resembles the contemporaneous Mayapan red ware, although its finest examples, often with fine incising, are considerably superior.

Heinrich Berlin reports a stela with figure in Campeche style and glyphs from Managua, near Tenabo, Campeche. He spent some time at Chinikiha, Chiapas, the first archaeologist in that site since Maler's hurried visit in 1898. He found an interesting sculptured serpent. From Miraflores, near Salto de Agua, Chiapas, he reports fragments of a large wall panel composed of 2 or more slabs, which resemble closely those from Palenque. At least 3 persons are depicted, and there is evidence of an Initial Series.

Thomas Ferguson and Edwin Shook made a brief reconnaissance of the Upper Grijalva valley, Chiapas, to pick a site for excavation by the New World Archaeological Foundation. They report a large site at Chiapa de Corzo with its main occupation on the pre-Classic horizons, and a deeply buried pre-Classic midden at Acala, 40 km. upstream. There are indications of a long pre-Classic occupation of the area.

The archaeological part of the expedition to eastern Chiapas sponsored by the Centro de Investigaciones Antropológicas de México consisted of Juan (Don) Leonard and Frederick Peterson. The shores and islands of Lake Miramar were explored. The lake is called Chankakna by the Lacandons and that name will be applied to the whole site, with various parts of it, such as Yaxhana on an island in the lake, having separate names. The site seems to extend all the way up the Chumhuitz valley. Six burials, some double, were excavated. Pottery is Classic period and shows relationship with the highlands of Mexico. One site on the shores of the lake has more than 50 house mounds.

LOWLAND SOUTH AMERICA

Brazil. Of interest to archaeologists is a detailed study of the ceramics of a modern Tropical Forest tribe, the Karajá, being made by Mário Ferreira Simões of the Serviço de Proteção aos Indios. Four months (July-August, 1954, and January-February, 1955) were spent among the Karajá and Javaé of the Rio Araguaia gathering an extensive collection of ceramic objects for the Museu do Indio in Rio de Janeiro and studying their manufacture and use. One of the primary objectives of this research is to determine the origin of the well-known Karajá dolls and to trace the development of this aspect of the pottery art.

Tobago. G. H. S. Bushnell, Curator of the Cambridge University Museum of Archaeology and Ethnology, gives the following report of investigations undertaken in March and April, 1955, on Tobago, British West Indies:

"Six weeks were spent on the island, mainly in reconnaissance, but trial excavations were carried out on three sites. A good deal of the island, particularly the

rugged schist area at the northern end, was uninhabited, and in the remainder pre-Columbian occupation seems to have been confined to the coast. Owing mainly to intensive cultivation of sugar, followed by coconuts, nearly all the known sites are thoroughly disturbed, and it is unlikely that many sites of importance remain to be discovered. There are a good many sites, but present indications are that occupation was not very prolonged. It may even have been intermittent, as it was in the early part of the 18th century, when all white settlers had left and Indians from the mainland came over to fish during the summer.

"The obvious place to look for the source of the aboriginal population is Trinidad, and an inspection of the material in the Royal Victoria Institute in Port-of-Spain, excavated by J. A. Bullbrook, makes it clear that the bulk of the Tobago material belongs to Rouse's third stage as outlined in his brief article in *Man* (July 1947). It is premature to make any statement about his two earlier ceramic styles, the Cedros and the Palo Seco, but his latest one, the Bontour, is almost certainly absent. No preceramic deposits were found."

VENEZUELA. Survey and excavation were conducted by John Goggin of the University of Florida and José M. Cruxent of the Museo de Ciencias Naturales, Caracas, on the islands of Margarita and Cubagua off the northeast coast of Venezuela in December, 1954, and January, 1955. The survey produced sites of 7 types, representing 3 distinct cultural horizons: preceramic, prehistoric ceramic, and historic ceramic. The preceramic sites were of 2 kinds, those producing shell adzes or *gubias* and those in which quartzite was used for artifacts. Prehistoric ceramic cultures included one with black-on-yellow painted pottery and another with modeled pottery of Barrancoid style. The historic period is represented by Nueva Cádiz, a Spanish and Indian town of about 1513-43; Los Obispos A, a Spanish town of about 1625, and Los Obispos B, a Spanish site of about 1820-50. Extensive excavations were made at Nueva Cádiz, in both houses and refuse middens. A considerable amount and variety of colonial material was recovered, including majolica and other ceramics, a large sample of Venetian-type glass vessel fragments and beads, coins, plain bronze armor and harness trappings, and gilded and enameled bronze work. The associated Indian material seems to have wide affiliations along the north coast of South America, from Trinidad to Colombia.

ANNUAL MEETING OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY, 1955

The twentieth annual meeting of the Society for American Archaeology was held on Thursday, Friday, and Saturday, May 5, 6, and 7, 1955, at the Indiana Memorial Union, Indiana University, Bloomington, Indiana. Total registration at the meeting was 77, and a number of unregistered persons attended the programs of the Society.

MEETING OF THE EXECUTIVE COMMITTEE

As required by Article VI, Section 3, of the Society's Constitution, the annual meeting of the Executive Committee was held prior to the annual business meeting of the Society. An account of this meeting is included in the report of the Secretary.

ANNUAL BUSINESS MEETING

The annual business meeting was called to order by President Robert Wauchope at 11:10 a.m. on Friday, May 6, 1955. About 50 members were present.

The minutes of the nineteenth annual meeting were approved as published in AMERICAN ANTIQUITY, Volume 20, Number 2, pp. 196-202 (October, 1954).

The report of the Treasurer (printed below) was read and accepted by the membership on the recommendation of the Auditing Committee (John M. Corbett, E. Mott Davis).

The report of the Editor (printed below) was read and accepted by the membership.

The report of the Secretary (printed below) was read and accepted by the membership.

The report of the Elections Committee (Joffre L. Coe; Marjorie F. Lambert; Albert C. Spaulding, Chairman) was read and accepted by the membership. The result of the mail ballot was (388 acceptable ballots received):

President: W. Duncan Strong

First Vice-President: H. Marie Wormington

Second Vice-President: Alex D. Krieger

Members of the Executive Committee (to 1957): Paul S. Martin, J. Charles Kelley

The following resolutions were presented by the Committee on Resolutions (John M. Goggin, Frederick Johnson) and accepted by the membership:

Resolved: That the Society for American Archaeology express its deepest appreciation for the services rendered by the Committee on arrangements, especially Thomas A. Sebeok, Glen A. Black, and W. M. Wentworth.

Resolved: That the Society for American Archaeology express its gratitude to the Program Committee, especially George I. Quimby, and the chairman of the respective sessions for their efforts in planning, organizing, and carrying out the program of this annual meeting.

Resolved: That the Society for American Archaeology express its gratitude to the President and Staff of Indiana University for making the facilities of their institution available to us and for their cordial hospitality.

Resolved: That the Society for American Archaeology express its deepest sympathies to the family of Dr. Alfred M. Tozzer over the loss of one of its most distinguished members, and to the families of our other recently deceased members.

The annual business meeting adjourned at 11:40 a.m.

ANNUAL DINNER

A joint banquet with the American Ethnological Society, the American Folklore Society, the Central States Anthropological Society, and the Society for Applied Anthropology was held at 6:30 p.m. at the Indiana Memorial Union. C. F. Voegelin was the presiding officer, and an illustrated address, "Ancient Peruvian Erotic Art," was presented by Alfred C. Kinsey.

OTHER SESSIONS

Thursday Morning, May 5. *The Middle American and Circum-Caribbean Areas.* James B. Griffin, Chairman.

1. J. Charles Kelley: "The Cultural Affiliations and Apparent Temporal Position of the Schroeder Site, Durango, Mexico."

2. William J. Mayer-Oakes: "Excavations at El Risco, Mexico, D.F."

3. Loring M. Hewen: "The Maya Walls of Cozumel Island."

4. John M. Goggin and Jose M. Cruxent: "A Preliminary Report on the Archaeology of Isla Cubagua, Venezuela."

5. Julian Granberry: "A Survey of Bahamas Archaeology."

6. Robert M. Adams: "Institutional Patterns and the Growth of Civilization in Mesoamerica, Peru, and Mesopotamia."

Thursday Afternoon, May 5. *Middlewest and Northeast.* William A. Ritchie, Chairman.

1. John C. McGregor: "An Archaeological Survey of the Illinois River Valley."

2. Raymond H. Thompson: "Microscopic Studies of Temper in Midwestern Pottery."

3. James H. Kellar: "The Archaeological Affiliations of the C. L. Lewis Stone-Mound."

4. Edward V. McMichael: "An Analysis of the McKees Rock Mound, Allegheny County, Pennsylvania."

5. Don W. Dragoo: "Some Archaic Complexes of the Upper Ohio Valley."

6. William A. Ritchie: "The Northeastern Archaic—A Review."

Friday Morning, May 6. *Early Man.* Douglas S. Byers, Chairman.

1. Ripley P. Bullen: "Florida Bone Beds and Their Relationship to Man."

2. George I. Quimby: "Some Comments on the Natchez Pelvis Find."

3. E. Mott Davis: "The Significance of the Sites at Medicine Creek, Nebraska, to Paleo-Indian Problems."

4. Alex D. Krieger: "An Evaluation of Some Recent Discoveries and Claims Bearing on the Antiquity of Man in America."

Friday Afternoon, May 6. *Symposium: Problems of Salvaging Archaeological, Historical, and Ethnological Data.* Sponsored by the Committee for the Recovery of Archaeological Remains. Frederick Johnson, Chairman.

1. J. O. Brew: "Opening Remarks on Behalf of the Committee for the Recovery of Archaeological Remains."

2. General Situation and Problems —
Frank H. H. Roberts, Jr.: "The Missouri Basin."
John M. Corbett: "Outside the Missouri Basin."

3. Waldo R. Wedel: "Contributions and Losses in Salvage Archaeology."

4. Ronald F. Lee: "Government's Role and Responsibility in Archaeological and Historical Salvage."

5. John L. Champe: "Co-operating Institutions and Their Problems."

6. Marvin E. Tong, Jr.: "Role of the Amateur and His Problems."

7. Fred Wendorf: "Highway Salvage Problems in New Mexico."

8. Frederica de Laguna: "Salvage of Ethnological Data and its Problems."

9. Frederick Johnson: "Recapitulation of Papers and Discussion."

Saturday Morning, May 7. *Southeast.* Jesse D. Jennings, Chairman.

1. John L. Cotter: "The Jamestown Investigations — Work in Progress."

2. Carlyle S. Smith: "Experiments in Checking Documented Dates Against Dates Derived from Trade Goods."

3. Stephen Williams: "Physiographic Regions and State Distribution in the Lower Mississippi Valley."

4. Glenn T. Allen, Jr.: "A Lithic Complex from Northwest Florida."

5. William H. Sears: "The Etowah Site Ceramic Sequence in Southeastern Prehistory."

6. Carol K. Rachlin: "A Preliminary Report on the Fabrics from the Angel Mounds Site."

Saturday Afternoon, May 7. *Western North America.* Paul Gebhard, Chairman.

1. Elaine Bluhm: "Mogollon Settlement Patterns."

2. Blanche Miller: "The Old Ones (Keet Seel)."

3. Georg K. Neumann: "The History of the Indians of the Central Plains — Bio-anthropological Evidence."

4. L. S. Cressman: "Archaeology of the Dalles Region, Oregon."

REPORT OF THE SECRETARY

Committees. The following committees were appointed by President Robert Wauchope and approved by the Executive Committee or elected by the Executive Committee as required by the Constitution and By-Laws of the Society.

Nominating Committee: George W. Brainerd, Chairman; E. Mott Davis; Dorothy L. Keur.

Viking Fund Award Committee: Richard K. Beardsley, Douglas S. Byers, John L. Champe, John L. Cotter, John M. Goggin, Robert F. Heizer, Marjorie F. Lambert, Douglas Osborne, Robert L. Rands, Frederica de Laguna, Joe Ben Wheat. First Vice-President Carlyle S. Smith served as nonvoting Chairman.

Program Committee: George I. Quimby, Jr., Chairman.

Committee on Local Arrangements for Twentieth Annual Meeting: Glenn A. Black, Chairman.

Auditing Committee: John M. Corbett, E. Mott Davis.

Committee on Resolutions: John M. Goggin, Frederick Johnson.

Elections Committee: Albert C. Spaulding, Chairman; Joffre L. Coe; Marjorie F. Lambert.

Other Activities. President Wauchope with the consent of the Executive Committee appointed Watson Smith as the Society's delegate to the 1955 annual meeting of the American Anthropological Association, Fred Wendorf as delegate to the International Arid Lands Symposium, and Irving Rouse as representative to the Council on Old World Archaeology.

President Wauchope solicited and obtained a grant from the Carnegie Corporation of New York for the purpose of holding a group of seminars on various broad topics of archaeological interest. It was planned to have the grant made to the Society, and a Seminars Planning Committee consisting of Robert Wauchope, Chairman; J. D. Jennings; Erik K. Reed; Albert C. Spaulding; and and Gordon R. Willey was approved by the Executive Committee. It proved to be impossible for the Carnegie Corporation to make the grant to the Society owing to its regulations as to the accounting practices and legal character of the recipient, and the grant was accordingly awarded to Tulane University. The seminars will proceed during the summer of 1955 as originally planned, under the auspices of Tulane University.

The Society cosponsored the 1954 annual meeting of the American Anthropological Association. A session on the topic "Settlements and Society: a Symposium in Archaeological Inference" was arranged with the aid of the Society's representative, Richard K. Beardsley.

The Nominating Committee presented the following names for the 1955 election of officers: for President — W. A. Ritchie, W. Duncan Strong; for First Vice-President — John M. Corbett, Linton Satterthwaite, Jr., H. Marie Wormington; for Second Vice-President — William G. Haag, Alex D. Krieger, Fred Wendorf; Executive Committee Member (to 1957) — John M. Goggin, Paul S. Martin, Watson Smith; Executive Committee Member (to 1957) — J. Charles Kelley, T. M. N. Lewis.

The Viking Fund Award Committee chose W. Duncan Strong as the 1954 medalist.

The Executive Committee's actions included: (1) approval of a registration fee of one dollar for the 1955 annual meeting; (2) approval of the recommendation that future Viking Fund Award committees should be composed of the 6 last recipients of the award and 6 other members appointed by the President with approval of the Executive Committee; and (3) preparation of a comment on the "Statement on Archaeological

Standards" to be read by the Secretary as a part of his report at the annual business meeting. The comment explained the original purpose of the Statement, summarized various objections which had been received by officers of the Society, and recommended that it not be adopted as an official declaration of the Society.

As required by the Constitution, the Executive Committee held its annual meeting on May 5, 1955, and took the following actions:

1. Accepted the preliminary report of the Secretary.

2. Voted against participation in the 1955 meeting of the American Association for the Advancement of Science and adopted the following resolution: "Be it resolved that the Society for American Archaeology will not send an official delegate to the Annual Meeting of the American Association for the Advancement of Science to be held in 1955 in Atlanta, Georgia, nor will the Society participate in any way in this or any future scientific meeting held under racially segregated conditions." The Secretary was instructed to include this resolution in his report at the annual business meeting and to transmit it to the proper officers of the American Association for the Advancement of Science.

3. Accepted the Treasurer's report and the proposed budget for 1955-1956.

4. Accepted the Editor's report.

5. Recommended that the second sentence of Article V, Section 1, of the Constitution be amended to read "An Executive Committee shall be comprised of the President as Chairman, the First Vice-President, *the Second Vice-President,* Secretary . . ." The Secretary was instructed to conduct a mail ballot on this amendment.

6. Accepted the invitation of the University of Nebraska for the 1956 annual meeting of the Society.

The Secretary's office conducted the usual correspondence relating to applications for membership and other matters. Names and addresses of the nominating committee and the offices to be filled at the 1955 election were listed in AMERICAN ANTIQUITY, Volume 20, Number 2, p. 202, as required by the Constitution and By-Laws of the Society; the place and date of the annual meeting were announced to all members more than 2 months in advance; programs were mailed to the membership more than 2 weeks in advance of the meeting date; and the list of nominees and the ballots were sent to the membership more than 30 days before the annual meeting. The "Statement on Archaeological Standards" was mimeographed and circulated to the membership for study in accordance with the action taken at the 1954 annual business meeting. A short account of the 1954 annual meeting was prepared for the journal *Archaeology* (Vol. 7, p. 252). The membership drive was continued by the energetic action of a number of individual members of the Society.

Respectfully submitted,

ALBERT C. SPAULDING, *Secretary*

REPORT OF THE TREASURER

As in previous years the major part of our income went towards the cost of preparing, printing, and distributing our journal, AMERICAN ANTIQUITY. We also contributed toward the cost of Memoir 10 which was jointly published with the American Anthropological Association.

Charges to authors for illustrations and reprints have provided a significant portion of our income. In this last fiscal year the actual income from this source fell considerably below the budget estimate and is the primary reason our cash balance for May 1, 1955 is less than the balance of a year ago.

Membership during the past year has increased only slightly. Since dues form our primary source of income an attempt to increase membership is still a basic need for the Society.

Financially our Society is in sound condition. We are just about in equilibrium, neither advancing nor retreating.

Respectfully submitted,

WILLIAM J. MAYER-OAKES, *Treasurer*

TREASURER'S REPORT FOR MAY 1, 1954 THROUGH APRIL 30, 1955

A. Operating Fund		
1. Receipts		
a. Balance forward May 1, 1954	$2769.00	
b. Dues received	7336.77	
c. Sale of back issues, AMERICAN ANTIQUITY	499.10	
d. Sale of Memoirs	290.37	
e. Reprint charges to authors	765.98	
f. Excess engraving charges to authors	313.15	
g. Gain on exchange	2.67	
Total		$11,977.04
2. Expenditures		
a. Printing AMERICAN ANTIQUITY (4 issues)	$6005.21	
b. Distributing AMERICAN ANTIQUITY	185.01	
c. Printing author's reprints	893.75	
d. Editorial assistant (3 issues)	600.00	
e. Editor's office expense	309.00	
f. Secretary's office expense	128.93	
g. Treasurer's office expense	71.00	
h. Charge for collecting dues @ $.25 ea.	302.50	
i. Annual meeting, 1954	152.45	
j. Toward Memoir 10	792.00	
k. Refund of overpayments	10.25	
Total		$ 9450.10
3. Cash Balance May 1, 1955		$ 2526.94
4. Outstanding May 1, 1955		
a. Accounts receivable	$316.20	
		$ 316.20
5. Total Assets, Operating Fund		$ 2843.14
B. Permanent Fund		
1. Deposited in Peoples First National Bank, Pittsburgh, Pa., May 11, 1954		$ 659.33
2. Interest		5.73
3. Total on hand April 30, 1955		$ 665.06

C. *Publication Fund*

1. Deposited in Peoples First National Bank, Pittsburgh, Pa., May 11, 1954	$ 1631.47
2. Interest	14.29
3. Total on hand April 30, 1955	$ 1645.76

PROPOSED BUDGET FOR 1955-1956

Receipts

a. Balance brought forward	$2525.00
b. Dues for 1955-1956 (1200 members)	7200.00
c. Sale of back issues, AMERICAN ANTIQUITY	400.00
d. Sale of Memoirs	225.00
e. Reprint charges to authors	750.00
f. Excess engraving charges to authors	300.00
g. Transfer from Publication Fund	800.00
Total Receipts	$12,200.00

Expenditures

a. Printing AMERICAN ANTIQUITY	$6500.00
b. Distributing AMERICAN ANTIQUITY	250.00
c. Printing authors' reprints	1000.00
d. Editorial Assistant	800.00
e. Editor's office expense	300.00
f. Associate Editor's office expense	50.00
g. President's office expense	50.00
h. Secretary's office expense	100.00
i. Treasurer's office expense	100.00
j. Charge for collecting dues	300.00
k. Annual meeting	150.00
l. Subsistence at annual meeting (Pres., Sec., Treas., Ed., if necessary)	100.00
m. Balance forward, May, 1956	2500.00
Total Expenditures	$12,200.00

REPORT OF THE EDITOR

With considerable help from the outgoing editor, the new editor took over in the spring of 1954. To his great advantage the Associate Editor and most of the Assistant Editors continued their duties through the period of change. In addition to 22 manuscripts on hand when the change was made, 111 new manuscripts were received, making a total available of 47 Articles, 83 Facts and Comments, and 3 potential Memoirs. Of these a substantial number is, unfortunately, still unpublished, due to our limits of space in the journal and the editor's unwillingness to curtail the book review section too drastically. Two of the memoir manuscripts have been withdrawn and publication elsewhere arranged, partly because of our inability to finance memoirs without substantial outside assistance, and one is still under consideration. In order to speed publication of major articles it has been decided to reduce somewhat the space allotted to Facts and Comments, giving priority in that section to replies to or comments on previously published articles, and brief announcements of special interest. Nevertheless, manuscripts for Facts and Comments as well as of Article length will continue to be welcome for consideration.

For several short manuscripts of distinctly localized interest it has been possible to arrange publication in an appropriate local journal, and it is hoped that this policy can be expanded to work to the advantage of all concerned.

With the resignation of William A. Ritchie as Associate Editor that position has been made into two, with Raymond H. Thompson becoming Associate Editor for Reviews and Clement W. Meighan Associate Editor for Notes and News. This will make these duties slightly less burdensome to the individuals who so generously undertake them.

The Editor is most appreciative of the enthusiastic assistance he has had from all of his staff during the past year. The Assistant Editors not only contribute material for Notes and News but also advise, when needed, on matters pertaining to their areas of competence, and compile the annual list of recent publications. In addition, through their active participation in local archaeological affairs, they are an important link between the Society and its members in various parts of the country.

The cooperation and patience of the University of Utah Press also deserves mention. To our great good fortunate they have been willing to continue printing the journal, and to put up with the occasional inconvenience that distance and post office delays have brought about.

The 4 issues of Volume 20 contained 21 Articles (230 pages), 42 Facts and Comments (87 pages), 40 Book Reviews (40 pages), 2 Obituaries, 36 pages of Notes and News, and sundry announcements and miscellaneous items, totaling 418 pages. Memoir 10, which had been arranged for by the previous editor, is appearing as a joint publication of the Society and the American Anthropological Association.

Respectfully submitted,

RICHARD B. WOODBURY, *Editor*

The nominating committee for the election of officers for 1956 consists of Waldo Wedel (Chairman), U.S. National Museum, Washington 25, D.C.; Arnold Withers, University of Denver, Denver, Colorado; and Gordon R. Willey, Peabody Museum, Harvard University, Cambridge 38, Mass. Suggestions to them for nominations may be made up to December 1. Officers to be elected are: President, First Vice-President, Second Vice-President, Secretary, and 2 Executive Committee members.

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